THE VETERINARY BULLETIN

1936.

VOLUME VI

WEYBRIDGE:
IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE VETERINARY BULLETIN

Vol. 6.] January, 1936. [No. 1.

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DISEASES CAUSED BY BACTERIA AND FUNGI.

KNIGHT, B. C. J. G. (1935). **An Essential Growth Factor for** *Staphylococcus aureus*. —*Brit. J. exp. Path.* **16.** 315-326. 5 tables. [6 refs.]

The existence of a substance essential for the growth of *S. aureus*, first described by HUGHES [(1932). *J. Bact.* **23.** 437.], has been confirmed. A method is described for preparing very active concentrates of this factor from crude marmite. The factor appeared to be essential for the proper growth of a strain of *Bacillus anthracis*.—W. R. WOOLDRIDGE.

GLOEDE, M. (1934). Zur Frage der Differenzierung von Streptokokken (Str. lactis und Str. agalactiae) und Enterokokken. **[The Differentiation of Streptococci** (*Str. lactis* **and** *Str. agalactiae*) **and Enterococci].**—*Inaug. Diss. Hanover.* pp. 30. 1 table. [22 refs.]

Gloede has compared the characters of *Str. agalactiae*, *Str. lactis* and of enterococci isolated from man and from animals, using ten strains of each kind, received as representative strains from workers on the particular organism or isolated by himself. The media with which the comparison was made included plain agar, litmus-milk agar, blood agar, china blue agar, saccharose-alkali-albuminate-brom-cresol purple agar (Haupt), the Endoplate of Yoshihara, and solid serum, broth serum broth, lactose broth, glucose broth, milk, litmus milk, methylene blue milk, bile peptone water, aesculin broth, ammonium molybdate and janus green.

Most of the media were of little or no differential value. *Str. agalactiae* and *Str. lactis* were best differentiated by the use of methylene blue milk, aesculin and janus green. The typical strains of *Str. agalactiae* were also distinguished from all other strains by the production of a flocculent deposit in broth media with a clear supernatant. Separation of the enterococci from *Str. lactis* and *Str. agalactiae* was not always possible because the strains of enterococci behaved in a variable manner. Other useful methods of differentiation were the use of litmus milk and the ammonium molybdate test. [The results with the media mentioned are in close agreement with those of others who have studied these organisms – this *Bull.* **4.** 303. Certain other results are, however, surprising, e.g. the strains of *Str. agalactiae* did not acidify or clot litmus milk and many strains classed as enterococci did not split aesculin, or grow in methylene blue milk].—A. W. STABLEFORTH.

LINTON, C. S., KIPPEN, A. A., & LOEB, L. (1935). **The Lesions Produced in the Uterus of the Guinea Pig by Injections of Suspensions of Hemolytic Streptococci and of the Pyocyaneus Bacillus at Different Stages of the Sexual Cycle.**—*J. infect. Dis.* **56.** 89-96. 1 fig. [4 refs.]

Small measured quantities of a suspension of a stock strain of *Str. haemolyticus* or of *Pseudomonas pyocyanea* were injected into the exposed and tied-off right horn of the uterus of guinea pigs which were at various stages of the sexual cycle, the left horn being left as a control. Two days later the horns were removed and sectioned. From the results in 52 guinea pigs, it is concluded that the effect of the injection of these bacteria is very pronounced if given at the time of, or shortly after oestrus, marked leucocytic reaction and pus accumulation being the most striking findings ; the effect then decreases so that the results of injection between the fourth and eighth days are slight. It then gradually rises again so that after injection at the 11th or 12th day marked reaction is again produced, approaching closely that produced by injection during oestrus.—A. W. STABLEFORTH.

KOCH, F. E. (1935). Enterokokkenstudien. Elektive- und Differenzierungsnährboden für Enterokokken. Tierpathogenität, Vorkommen und Pathogenität der Enterokokken. [**Studies on the Enterococcus. Selective and Differential Culture Media for Enterococci. Pathogenicity for Animals**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 348-367. 3 tables. [Numerous refs.]

Enterococci can be divided into three types and one miscellaneous group according to their fermentation of maltose, laevulose, lactose, galactose, saccharose and dextrose. Type A and the miscellaneous group are destroyed by heating to 56°C. Types B and C are thermostable. A new differential medium for enterococci is described consisting of meat agar containing 1 per cent. of maltose, 1 per cent. of bile salt, 0·1 per cent. of aesculin and 5 per cent. of a 1 per cent. solution of ferric citrate. After being sterilized and the pH adjusted to 8, 0·5 per cent. of china blue is added and 5 per cent. of sheep red blood corpuscles. The three types of enterococci give different colonies in such media, type A being brownish-black, type B bluish-black and type C greenish-yellow. Further details of their differentiation on this medium are noted. The greatest percentage of enterococci in bovine faeces and in milk belong to type B. The pathogenicity of enterococci is discussed.—E. J. PULLINGER.

DEBELIĆ, S. (1935). Bedrenica (anthrax) u Jugoslaviji. [**Anthrax in Yugoslavia**].—*Vet. Arhiv.* **5.** 340-350. 4 tables, 3 charts. [Abst. from German summary].

The following conclusions are drawn from a study of the incidence of anthrax in animals and man in Yugoslavia :– (1) next to swine fever, it is the most widespread disease among animals in that country ; (2) its occurrence in man is an important economic problem, and (3) it occurs most frequently in autumn and summer.

SIRIBAED, L. (1935). **B. siamensis, a Pathogenic Variety of B. subtilis.**—*J. infect. Dis.* **57.** 143-146. [5 refs.]

This paper gives a detailed description of a pathogenic, aerobic, spore-bearing organism closely resembling *Bacillus anthracis* but which can be distinguished from it by its motility and slight cultural differences. Its pathogenicity and cultural characters differentiate it from *B. subtilis*. *B. siamensis*, as this organism is called, is highly pathogenic for guinea pigs, mice and white rats by subcutaneous, intravenous and intraperitoneal injections. Death from septicaemia occurs in two days.—GWILYM O. DAVIES.

WILBRAND, E. (1935). Hat die Bodenformation Einfluss auf die Verbreitung der Lungentuberkulose bei Mensch und Tier ? [**The Influence of the Topography of the Country on Lung Tuberculosis in Animals and Man**].—*Z. Tuberk.* **72.** 273-277. 1 fig., 2 tables. [5 refs.]

Wilbrand reports that in the Naugard area of Prussia one district, with a tenth of the population of the area, has shown for several years a half of the cases of open tuberculosis. He puts forward as a reason that in this district, which consists largely of bog and swamp, mists are of frequent occurrence and droplet infection is facilitated. Bovine tuberculosis is said to parallel the distribution amongst human beings.—A. W. STABLEFORTH.

HAMERTON, A. E. (1935). **Distribution and Comparative Morbid Anatomy of Tuberculosis in Captive Animals.**—*Brit. J. Tuberc.* **29.** 145-151. [6 refs.] [Reprinted in *Vet. J.* **91.** 356-362].

The first section of this paper deals with the distribution of tuberculosis amongst the various zoological species. The author shows that, whilst most species kept under natural conditions do not suffer from tuberculosis, many easily become infected in captivity and that a marked difference in susceptibility may be observed between the various families or genera of a given order, e.g. in the order Artiodactyla, the deer, oxen and pigs are susceptible but camels are apparently resistant. The llamas, another branch of the Camelidae, are however, frequently infected. A table is given to show the zoological distribution of the 78 cases of tuberculosis which have occurred at the Zoological Gardens, London, during the last seven years. References are given to determinations of the type of infecting organism.

The second section deals with morbid anatomy and histology, a contrast being drawn between the ulcerative lesions associated with cavitation found in the carnivores, and the broncho-pneumonia and pulmonary consolidation and production of pearl lesions in the bovines. The lesions found in the apes and monkeys resemble those found in the young human subject. Those found in captive wild oxen, deer, antelopes and swine closely resemble those of their domesticated relations, etc.

Finally, the microscopic structure of the lesions and appearance of the bacilli are discussed.—A. W. Stableforth.

Verge, J. (1935). Les maladies communes à l'homme et aux animaux. VIII. Le rôle du bacille bovin dans l'étiologie de la tuberculose pulmonaire humaine. [**Diseases Transmissible from Animals to Man. VIII. Role of the Bovine Type in the Aetiology of Human Pulmonary Tuberculosis**].—*Rev. gén. Méd. vét.* **44.** 464-466. 2 tables. [12 refs.] [For absts. of previous articles in this series, see this *Bull.* **4.** 207 and **5.** 417 and 491].

A review.

Boquet, A., & Laporte, R. (1935). Identification des bacilles tuberculeux humains et bovins par l'inoculation intrapleurale au lapin. [**The Identification of Human and Bovine Tubercle Bacilli by Intrapleural Injection into Rabbits**].—*C. R. Soc. Biol. Paris.* **119.** 1250-1253.

When 0·01 mg. of *Mycobact. tuberculosis* of the bovine type is inoculated intrapleurally into rabbits, severe generalized tuberculosis follows, death often occurring in less than two months. The human type, on the other hand, is much less pathogenic by this route than by others. The pleural lesions are usually localized to the side of the chest which is inoculated. Some generalization occurs resulting in pulmonary lesions, sometimes of a severe nature, but the other organs of the body usually escape for at least two months. The authors regard the intrapleural method as a further way of differentiating the human from the bovine type of *M. tuberculosis.* Ten new strains are dealt with.—A. W. Stableforth.

Gerosa, G. (1935). Cinque anni di vaccinazione con B.C.G. nelle aziende agricole del Lodigiano. [**Five Years of BCG Vaccination at Lodigiano, Italy**].—*Notiz. Ist. antituberc. Milano.* **13.** 2-9. [1 ref.]

An analysis of the report issued after five years' experience of BCG vaccine in the field leads the author to the following conclusions. In the first place, it has been established that the vaccine is harmless for calves. In fact, vaccinated animals develop better than non-vaccinated animals. Secondly, breeding heifers never show signs of tuberculosis after vaccination and finally, numerous observations have made it clear that vaccination inhibits or at least reduces the elimination

of tubercle bacilli by affected animals and so checks one of the principal sources of infection.—J. A. NICHOLSON.

SCHAEFER, W. (1935). La dissociation et la spécificité sérologique des bacilles de la tuberculose aviaire. **[The Dissociation and Serological Specificity of Avian Tubercle Bacilli].**—*C. R. Soc. Biol. Paris.* **119.** 59-62. 1 table.

By means of complement-fixation tests it was shown that an antiserum produced against an S avian strain of *Mycobact. tuberculosis* contained a non-specific antibody which reacted with alcoholic extracts of all acid-fast bacteria, and a specific antibody for the avian strain. This specific antibody gave a stronger reaction with S avian antigen than with R avian antigen and it was much more marked when the group antibodies were first of all absorbed from the serum by other acid-fast bacteria.—GWILYM O. DAVIES.

CHARGAFF, E., & LEDERER, E. (1935). Sur les pigments caroténoides de deux bactéries acido-résistantes. **[The Carotenoid Pigments of Two Acid-Fast Bacteria].**—*Ann. Inst. Pasteur.* **54.** 383-388. [5 refs.]

The authors studied the carotenoid pigments of the *Lombardo Pellegrini* bacillus and the bacillus of Grassberger by spectroscopic methods. Cultures of these organisms were grown in glycerin broth and exposed to daylight at room temperature for one week. The bacilli were then extracted with acetone and petroleum ether and the carotenoid pigments and xanthophyles separated by means of methanol. It was found that both bacilli contain carotene and closely related xanthophyles.—J. A. NICHOLSON.

UGA, T. (1935). **On the Oxygen Metabolism of Tubercle Bacilli and Some Kinds of Acid-Fast Bacilli.**—*Jap. J. exp. Med.* **13.** 167-222. 29 tables, 19 charts. [23 refs.] [In English].

The oxygen metabolism of various acid-fast organisms has been examined by serial analysis of the gaseous atmosphere at different stages of growth, when the organisms are grown in a small number of test tubes placed in closed vessels of from one to three litres capacity. The optimum oxygen concentration for the growth of human and bovine tubercle bacilli is 40 per cent. The respiratory quotients for the human, bovine and avian types are 0·8325, 0·8281 and 0·8295 respectively. The optimum oxygen concentration for BCG is 10 to 20 per cent. and the respiratory quotient is 0·8197.—W. R. WOOLDRIDGE.

ALSTON, J. M., & GRIFFITH, A. S. (1935). **The Bacteriological Characteristics of the Tubercle Bacilli.**—*Edinb. med. J.* **42.** 175-176.

The tubercle bacilli from 42 cases of human renal tuberculosis, which in seven cases was associated with tuberculosis of the genital tract, were obtained in culture. The isolated strains were studied and it was found that the organism was of the bovine type in 30·9 per cent. of the cases.—F. BLAKEMORE.

SANARELLI, G., & ALESSANDRINI, A. (1935). Etudes sur l'ultravirus tuberculeux. (Troisième mémoire). Sur la culture des " protogènes tuberculeux ". **[The Tuberculous Ultravirus. III. The Cultivation of Tuberculous " Protogens "].**—*Ann. Inst. Pasteur.* **54.** 676-696. 2 tables. [21 refs.]

The authors describe a series of experiments which they consider confirm the existence of a cycle of evolution of the tubercle bacillus.

When double collodion sacs, the inner chamber of which contained a suspension of tubercle bacilli, were placed into the peritoneal cavity of rabbits, it is claimed

that the ultravirus of tuberculosis passed spontaneously through the filter into the outer chamber. The same result was obtained *in vitro* by filling the outer chamber of the sac with Sauton's fluid. The authors state that the ultravirus may develop into bacterial forms, which they call " protogènes tuberculeux ". The latter form was found to be only slightly pathogenic for guinea pigs and, when grown on suitable media, the colonies were not typical of *Mycobact. tuberculosis*. Subcultures, however, yielded typical colonies of tubercle bacilli which were virulent for guinea pigs. When the collodion sacs were left in the peritoneal cavity for more than 40 days it was often impossible to obtain cultures or to demonstrate the presence of " protogènes tuberculeux " microscopically. This failure of the organism to develop is believed to be due to the fact that it is attenuated by the conditions existing in the peritoneal cavity.—F. Blakemore.

Grasset, E. (1935). Procédé de culture des différents stades évolutifs du bacille tuberculeux et BCG (granulaire, filamenteux et bacillaire non acido-résistant et acido-résistant), à partir de lysats obtenus par congélation répétée. [**Method of Cultivation of Different Stages of the Life Cycle of the Tubercle Bacillus and of BCG**].—*C. R. Soc. Biol. Paris.* **119.** 261-265. [1 ref.]

By repeatedly freezing suspensions of BCG and virulent tubercle bacteria, the author claims to have obtained solutions of bacterial products rich in filtrable virus. By cultivating these extracts on Sauton's medium and other appropriate media, he was able to follow the various stages of development of these organisms from the non-acid-fast granular form to the non-acid-fast bacillary stage and, finally, to the form of the original acid-fast bacilli [full details of the method are given].—Gwilym O. Davies.

Saenz, A., Costil, L., & Sadettin, M. (1935). Douze souches appartenant à divers types de bacilles acido-résistants isolées de l'organisme de cobayes neufs. [**Twelve Strains of Acid-Fast Bacilli Isolated from Young Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **118.** 643-645. [1 ref.]

Twelve strains of acid-fast bacilli have been isolated from young guinea pigs which had been in experimental cages for several months. The guinea pigs reacted to tuberculin and an attempt was made to increase the proportion of guinea pigs carrying this organism by injections of various sterile materials. Eight of the strains were isolated from guinea pigs receiving acetone extracts, some of the guinea pigs showing abscess formation at the site of inoculation. [For further details, given in a later paper, see following abst.]—R. Lovell.

Saenz, A., Costil, L., & Sadettin, M. (1935). Etude des propriétés biologiques des souches de bacilles acido-résistants isolées de l'organisme de cobayes neufs. [**The Biological Properties of Acid-Fast Bacilli Isolated from Young Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **118.** 645-648. [4 refs.]

The acid-fast bacilli isolated from young guinea pigs kept in experimental cages appear to form a connecting link between the saprophytic acid-fast bacilli and tubercle bacilli. There were certain characteristics, especially with regard to their lack of virulence, associating them with S strains of tubercle bacilli of mammalian type, but on the other hand they grew rapidly on media with a definite pigment formation.—R. Lovell.

Nègre, L., & Valtis, J. (1935). Essais de modification *in vivo* des propriétés biologiques de bacilles tuberculeux de types humain et aviaire et du bacille paratuberculeux de la fléole par l'extrait acétonique de bacilles de Koch.

[Attempts to Modify *in vivo* the Biological Properties of Human and Avian Types of Tubercle Bacilli and of *Mycobact. phlei* by Acetone Extracts of Tubercle Bacilli].—*Ann. Inst. Pasteur.* **55.** 153-162. [15 refs.]

The authors and VAN DEINSE previously reported [this *Bull.* **3.** 590.] that filtrable elements of *M. tuberculosis* recovered their virulence when they were inoculated into guinea pigs which were then given bi-weekly injections of an acetone extract of the same organism. Nègre and Valtis have, therefore, now endeavoured to find whether these acetone extracts have any effect on the virulence of the normal forms of *M. tuberculosis*. The extract was obtained from tubercle bacilli of human type.

In rabbits which were inoculated intravenously with 0·01 mg. of various strains of *M. tuberculosis* of human type and which were submitted to repeated subcutaneous or intravenous injections of acetone extract, no evidence of any increase of pathogenicity was obtained. Similarly, strains isolated from guinea pigs which had been inoculated subcutaneously and submitted to repeated injections of acetone extract did not show increased virulence when subsequently tested on rabbits. Several successive passages of avian tubercle bacilli, or of *M. phlei* in guinea pigs which were repeatedly injected with acetone extracts, failed to cause any generalization of those organisms in spite of the fact that they appeared to multiply more abundantly at the seat of inoculation. Thus no evidence was obtained that any modification of the pathogenicity of strains of *M. tuberculosis* could be produced, by treatment of the animals inoculated with those strains, with acetone extracts of human *M. tuberculosis*.—A. W. STABLEFORTH.

KRUPSKI, A., & OSTERWALDER, H. (1935). Klinisches zur Paratuberkulose des Rindes. **[Johne's Disease in Cattle].**—*Schweiz. Arch. Tierheilk.* **77.** 169-174. 1 table. [15 refs.]

Further evidence is presented as to the unreliable nature of avian tuberculin when used as a diagnostic agent for the detection of Johne's disease in cattle. A number of cows were inoculated intravenously with 10 c.c. of an American brand of avian tuberculin, an increase in temperature of 1·5°C. or more between the third and the eighth hour after injection being regarded as a positive reaction.

The result of the test is recorded in 14 instances in which the animal was shown at *post-mortem* examination to be suffering from Johne's disease. The tuberculin test only proved positive in four of these cases.

Reference is made to American work [HAGAN, W. A., & ZEISSIG, A. (1929). *J. Amer. vet. med. Ass.* **74.** 985. and below] in which it is stated that conception was often more difficult in affected animals and that the causal organism had been isolated by ALEXJEFF-GOLOFF from the blood stream, ovaries and allantoic fluid.
—N. S. BARRON.

HAGAN, W. A., & ZEISSIG, A. (1933). **Six Years' Experience with a Herd Experimentally Infected with Johne's Disease.**—*Cornell Vet.* **23.** 1-15. 1 table, 6 charts. [1 ref.], and in *Rep. N.Y. St. vet. Coll. 1932-1933.* pp. 134-149.

HAGAN, W. A., & ZEISSIG, A. (1933). **Studies on the Control of Johne's Disease.**—*J. Amer. vet. med. Ass.* **82.** 391-406. 4 tables. [8 refs.], and in *Rep. N.Y. St. vet. Coll. 1932-1933.* pp. 120-133.

These papers contain the authors' observations over a period of six years on a herd containing animals naturally and experimentally infected with Johne's disease.

In the first paper they state that all animals drenched with infected tissue developed the disease but that all attempts to infect cattle by intravenous injection

of cultures or diseased tissue failed. Thirteen animals became infected naturally and five died, but 16 lived in the midst of disease, over a period of four years, without contracting it. The incubation period varied from five to 23 months.

In the second paper the authors claim a reasonable degree of accuracy, as a diagnostic agent, for potent avian tuberculin injected intravenously. They found both johnin and avian tuberculin unsatisfactory when used intradermally and subcutaneously and johnin had no advantages over avian tuberculin. The complement-fixation test, although not specific, is a useful confirmatory test, particularly in clinical cases which show no allergic response.—GWILYM O. DAVIES.

CAUCHEMEZ, L., & SERGENT, G. (1934). Le diagnostic de l'entérite hypertrophiante par le recherche des bacilles de Johne dans les déjections. [**Diagnosis of Johne's Disease by Examination of Faeces for** *Mycobact. paratuberculosis*].—*Bull. Acad. vét. Fr.* **7.** 372-376. [14 refs.]

In this article the authors, realizing the importance of preclinical diagnosis of Johne's disease, describe their experiments using the methods of other workers, notably those of VALLÉE, LEBAILLY, KRISTNAMURTI, CERNAIANU, TELEMANN, RINJARD, HAUDROY, VENOL, BEACH and WISNICKY and others, and the results obtained. Their investigations have been carried out at the abattoir of LaVillette since 1933. On the whole the results they obtained are still unsatisfactory. Accordingly, they still believe that there is no method of examining faeces or rectal scrapings which is reliable in the diagnosis of Johne's disease, and that the reaction to johnin is still the only reliable test. They have shown by their experiments the real value of the various methods of examination which may be made on faeces and their work is, therefore, of importance.—K. D. DOWNHAM.

MISSENARD. (1935). Essais de traitement de la lymphadénie caséeuse du mouton et de la chèvre au Soudan Français. [**Treatment of Caseous Lymphadenitis of Sheep and Goats in the French Sudan**].—*Bull. Acad. vét. Fr.* **8.** 314-319.

The author states that *Corynebact. pseudotuberculosis ovis* has not been isolated from cases of caseous lymphadenitis in the French Sudan and that the disease in that country is due to a staphylococcus which is frequently associated with other bacteria. A series of experiments was carried out with the object of treating and preventing cases of the disease. Treatment by means of bacteriophage and antivirus was not found to be effective or convenient. Intradermal vaccination of young lambs with heat-killed cultures of the causal organism, however, was found to produce some immunity and it is suggested that this method of prophylaxis is worth an extensive trial.—F. BLAKEMORE.

DEBELIĆ, S. (1935). Sakagija (malleus) kod zivotinja u Jugoslaviji. [**Glanders in Yugoslavia**].—*Vet. Arhiv.* **5.** 373-377. 2 tables, 1 chart. [Abst. from German summary].

Official statistics in Yugoslavia show that, during the five years 1924 to 1928, glanders occurred continuously or intermittently in 28 departments while no cases were recorded in five departments.

DELAPLANE, J. P., ERWIN, L. E., & STUART, H. O. (1934). **A Hemophilic Bacillus as the Cause of an Infectious Rhinitis.**—*Bull. R. I. agric. Exp. Sta.* No. 244. pp. 12. 2 figs., 3 tables. [9 refs.] [Abst. from abst. in *Exp. Sta. Rec.* **71.** 854-855].

The authors report upon studies made of a new highly virulent respiratory infection first observed in several flocks of chickens and two flocks of pheasants in Rhode Island during the summer of 1932.

The name *Haemophilus gallinarum* is proposed for the Gram-negative haemophilic bacillus isolated. It is said to be similar to one described by DE BLIECK in Holland [(1932). *Vet. J.* **88.** 9.] and to that described by NELSON [this *Bull.* **5.** 602].

The organism grows well on blood agar, maximum growth being obtained in 24 to 48 hours. Subcutaneous inoculation of pigeons with such a culture caused local swelling and general depression after an interval of 24 hours. The organism is considered to be the cause of the disease.—J. E.

NELSON, J. B. (1935). **Uncomplicated Fowl-Coryza.**—*J. Amer. vet. med. Ass.* **86.** 409-418.

Uncomplicated coryza is easily kept going by intranasal inoculations of healthy fowls at intervals of two to four weeks and passage does not appear to reduce the virulence.

Two distinct types were met with and it is the type having a rapid onset and an incubation period of two to three days which is the main subject of this paper. Symptoms and *post-mortem* findings are given in detail. The disease appeared to be milder under laboratory conditions than in the field. The isolation of a bacillus and its cultural characters and pathogenicity are described, but the disease produced by it was less severe than that set up by the injection of " exudate ". This fact, together with the results of cross-immunity tests, does not permit a final statement regarding the aetiology to be made.—J. E. WILSON.

OCHI, Y. (1933-1934). **Studies on Haemorrhagic Septicaemia Organisms, especially on their Variability. Report I. Study on So-called Fowl Cholera Organisms. Report II. Studies on Haemorrhagic Septicaemia Organisms Isolated from So-called Swine Plague. Report III. Studies on Haemorrhagic Septicaemia Organisms Isolated from Cattle. Report IV. Studies on Haemorrhagic Septicaemia Organisms isolated from Sheep. Report V. Correlations between Haemorrhagic Septicaemia Organisms Isolated from Various Animals.**—*8th and 9th Rep. Govt. Inst. vet. Res. Fusan, Japan. 8th Rep.* Pt. 1. pp. 87-110, and *9th Rep.* Pt. 1. pp. 40-55. 20 tables. [53 refs.] [In Japanese : abst from English summaries in *8th Rep.* Pt. 2. pp. 14-16, and *9th Rep.* Pt. 2. pp. 5-6].

Report I states that stock culture strains of fowl cholera showed two distinct forms of colony, one a transparent, non-fluorescent colony of fixed type, regarded as a variant, and the other a greyish-white fluorescent colony which on further subcultivation produced mixed forms. Although these two types were almost identical in their morphological, cultural and biochemical reactions there were marked differences in their agglutination reactions and pathogenic properties.

Report II records that similar differences were found in strains isolated from pigs.

Report III concerns haemorrhagic septicaemia organisms isolated from cattle. Similar variations were found but, apart from these, all strains had similar morphological, biological, antigenic and pathogenic properties.

Report IV gives an account of further experiments by the author, but in this report he confines his attention to those organisms isolated from sheep. Similar variations to those recorded in the previous reports are described, which, if taken into consideration, show that the ten strains used could be divided into two types by their biological, antigenic and pathogenic properties.

Report V shows the relationship which exists between haemorrhagic septicaemia organisms isolated from different hosts. The strains used were isolated from

fowls, swine, cattle, sheep, buffaloes and mice and very little morphological and biological difference was found to exist. By means of cross-agglutination tests it was possible to divide all the strains into four groups – A, B, C and D. The features of these groups are described. The author concludes by saying that the generally adopted zoological classification is of no value as the classification should be based on the serological, immunological and pathogenic differences which exist.

[Report VI has been abstracted in this *Bull.* **5.** 114].—GWILYM O. DAVIES.

YUSEF, H. S. (1935). **A Contribution to the Serological Classification of *Pasteurella* Strains.**—*J. Path. Bact.* **41.** 203-206. 1 table. [1 ref.]

By the use of precipitin methods, the author has been able to classify 14 of 21 strains of pasteurella. Antigens were acid extracts of growth in Roux bottles of agar. Owing to cross-precipitation, recourse was made to precipitin absorption tests and the results tended largely to confirm the work of CORNELIUS [(1929). *J. Path. Bact.* **32.** 355.] who had worked with the same strains using agglutinin absorption methods. Six recently isolated strains were also tested, all belonging to one type. This work again stresses the unsatisfactory method hitherto employed of classifying pasteurella according to their zoological origin.—R. LOVELL.

CSONTOS, J. (1935). A baromfikolerás megbetegedések keletkezésének feltételeiröl. [**The Epidemiology of Fowl Cholera**].—*Allatorv. Lapok.* **58.** 11-15. [2 refs.] [Abst. from abst. in *Berl. tierärztl. Wschr.* **51.** 247].

The author states that, in the absence of a predisposing factor such as exposure to cold, unsuitable feeding, long journeys, vitamin deficiency, helminth infestation etc., *Pasteurella aviseptica* cannot cause the disease.

He considers the agglutination test to be the most suitable method of diagnosis, especially in cases without clinical symptoms.

SANDIFORD, B. R. (1935). **The Paracolon Group of Bacteria.**—*J. Path. Bact.* **41.** 77-78. 3 tables. [20 refs.]

A group of coliform organisms which culturally resemble *Bact. coli*, except that they either do not ferment lactose or ferment it only after incubation for five to 14 days, has been studied and referred to as " paracolon ". Forty-one strains were isolated from stools sent to the central laboratory at Cairo for examination for dysentery and six were isolated from normal stools.

The author considers their presence in a stool to be probably without aetiological significance. All strains were MR + and VP – whilst all except three formed indol. None were agglutinated by various salmonella sera, whilst the group as a whole is serologically heterogeneous. Strains of *Bact. asiaticum* (Castellani) isolated were also examined and, as most of the strains were late-lactose fermenters, the author concludes that this organism should be regarded as a member of the " paracolon " group. [It seems a pity to perpetuate the term " paracolon " as some of the early strains isolated in Denmark from calves suffering from dysentery and named " paracolon " have been shown to be genuine salmonella bacteria. Some confusion is still bound to arise between these and the non-pathogens described in this paper].—R. LOVELL.

JANSEN, J. (1935). Agglutinatiemethoden bij eendensalmonellose. [**Agglutination Methods for Diagnosing Salmonella Infection in Ducks**].—*Tijdschr. Diergeneesk.* **62.** 517-526. [2 refs.] [English, French and German summaries : abst. from orig.]

Twenty-nine ducks were examined for evidence of infection with *Salmonella*

typhi-murium (Breslau type) and *S. enteritidis* by means of the rapid and ordinary agglutination tests. The sera of ten birds contained agglutinins for *S. enteritidis*, whilst this organism was isolated four times from ovaries of birds and once from an infected joint.—E. J. PULLINGER.

RIEVEL. (1933). Versuche an Rindern, die Dauerausscheider von Enteritis-Gärtner-Bakterien mit dem Kote sind. [**Experiments on Cattle Excretors of** *Salmonella enteritidis*].—*Arch. wiss. prakt. Tierheilk.* **66.** 317-332. 4 graphs. [25 refs.]

Four cattle excreting *S. enteritidis* have been kept under observation for 18 months in order to determine the clinical picture, the excretion of the organisms, the agglutinin content of their sera and other details, including the danger to man of their milk and meat.

Details are given for each animal and, with the exception of diarrhoea, which may be persistent or transient, there appears to be little to record concerning their clinical condition. The excretion of *S. enteritidis* varied and, in all the animals, there were periods of different length when no *S. enteritidis* were found in the faeces. The agglutination titres also varied up to 1 : 3,200, although the author considers that a titre of 1 : 200 should be counted as a positive reaction. [There is a lack of detail regarding the type of antigen used].

The milk of these cattle appeared to be free from *S. enteritidis* which, being a human pathogen, is of importance. The danger of the milk becoming contaminated with the infected faeces is, however, recognized and it is also pointed out that records of udder infection with this organism are known. Heating of such milk is necessary if it is to be used for human consumption.

At *post-mortem* examination of such slaughtered animals, the bacteriological examination of the bile is advocated as most important. [From a public health point of view these animals constitute a great danger to health as there is in addition a great liability of contamination of meat in the abattoir. The importance of the communication is the persistent though intermittent excretion of a dangerous human pathogen].—R. LOVELL.

GRAHAM, R. (1935). **Pullorum Disease of Chicks. (Bacillary White Diarrhea).** —*Circ. Ill. agric. Exp. Sta.* No. 432. pp. 12. 11 figs.

This leaflet gives a very clear and full description of *Salmonella pullorum* infection under the following headings :– cause, symptoms in chicks, spread, methods of control, tests for the detection of carriers and essentials of sanitation. The technique of the rapid whole-blood stained antigen test is very fully described and well illustrated.—R. F. GORDON.

TE HENNEPE, B. J. C., & DE GIER, C. J. (1935). Een vergelijkend onderzoek betreffende verschillende pullorum- en kleinsche-ziektestammen. [**Comparison of Strains of** *Salmonella pullorum* **and** *S. gallinarum*].—*Tijdschr. Diergeneesk.* **62.** 187-192. 4 tables. [English, French and German summaries : abst. from orig.]

The biological features of *S. pullorum* and *S. gallinarum* are not similar. Of 80 cultures of *S. pullorum* of Dutch origin, 46 attacked maltose, but only one fermented dulcite. Of 11 English strains, all fermented dulcite. Of 20 Dutch strains of *S. gallinarum*, 19 fermented maltose and all fermented dulcite. Different cultures were agglutinated by the same fowl serum in different titres. Not all strains are equally suitable for preparation of antigens and hence they should be selected for the purpose accordingly.—J. VAN DER HOEDEN (UTRECHT).

FERREIRA, A. J. (1933). Vérification bactériologique de la brucellose bovine à Fafe (Portugal). [**Bacteriological Proof of the Existence of Bovine Contagious Abortion in Portugal**].—*Arch. Inst. bact. Cam. Pest.* **7.** 131-132. [In French].

Brucella abortus was isolated by inoculation of guinea pigs with milk from recently aborted cows.—R. S. ROBERTS.

RUNGE, S. (1935). Uwagi o ronieniu zakaznem bydla. [**Bovine Contagious Abortion in West Poland**].—*Wiad. weteryn.* **14.** 329-341. 1 table. [27 refs.] [Abst. from German summary].

In recent years there has been a reduction in the number of cases of contagious abortion in West Poland. The author ascribes this to the decrease in trade in livestock and to vaccination with live cultures. He claims success in the treatment of this disease by triple injection of 1 per cent. trypan blue with 0·5 per cent. "urotropine" intramuscularly. He infers that the good results are due to stimulation of the reticulo-endothelial system.—J. E.

KASTLI, P., & SAXER, E. (1934). Ueber den Einfluss der Banginfektion auf die Entstehung von Euterkrankheiten, besonders des gelben Galtes. [**Influence of *Brucella abortus* Infection in the Occurrence of Streptococcal Mastitis**].—*Schweiz. Arch. Tierheilk.* **76.** 629-637. [21 refs.]

Extracts from the literature on the bacteriological diagnosis of *Br. abortus* infection and on the connexion between this infection of the udder and streptococcal mastitis are followed by the authors' report on the examination of some 400 individual milk samples sent for examination in the course of routine milk control in the Berne district.

The rapid whey agglutination test using the antigen of Donham and Fitch was employed for the diagnosis of *Br. abortus* infection, the authors speaking highly of its reliability, and the common tests (sediment, catalase, microscopic examination and culture) for streptococcal infection.

In an examination of milk from healthy udders they found that more than one-third of a total of 245 cows were producing milk infected with *Br. abortus.*

In an examination of milk from 381 diseased udders, (1) as regards milk changes caused by streptococcal mastitis, 24·3 per cent. of 156 cows showed positive agglutination of *Br. abortus* by the rapid method ; (2) as regards other milk changes, 36 per cent. of a total of 220 cows showed positive agglutination of *Br. abortus.*

From their experiments they concluded that *Br. abortus* agglutinin was found as often in normal milk as in milk from udders affected with mastitis ; whilst admitting that *Br. abortus* may cause mastitis in certain cases they do not consider there is any relationship between catarrhal mastitis, or even a predisposition to it, and infection with *Br. abortus.*—K. D. DOWNHAM.

JOHANSSON, S. (1933). Febris undulans hos häst. [*Brucella abortus* **Infection in the Horse**].—*Svensk VetTidskr.* **38.** 283-303. 6 figs., 1 table. [7 refs.] [German summary : abst. from orig.]

A detailed report with case records of 12 cases of *Br. abortus* infection in farm horses in the province of Jönköping, Sweden. In all cases the horses had been in contact with infected cattle. A few horses showed no clear evidence of ill-health, some showed an undulant type of temperature curve, and broke down for a time after being put to heavy work ; some, in addition, showed poll-evil or fistulous

withers, or inflammation of other synovial cavities (e.g. stifle joint). Four had to be killed, but recovery usually occurred after several months' illness.

Spiroptera reticulata was observed to be parasitic in almost all horses on one farm and it is considered that its presence in the ligamentum nuchae predisposes to the localization of *Br. abortus*.

A dead vaccine was used for curative purposes on two horses : one recovered and the other reacted so severely that it had to be killed.—J. E.

SLAVCO, G. (1934). La brucellosi suina. [**Brucella Infection in Swine**].—*Azione vet.* **3.** 416-419, 434-440 and 453-459. 1 fig., 4 tables, 4 graphs. [29 refs.]

An account is given of the incidence, aetiology, symptoms, diagnosis and prophylaxis of brucella infection in pigs and the results of some transmission experiments are recorded. These were carried out on three pigs which had been negative to the agglutination test on several occasions and showed that the bovine strain of *Br. abortus* is capable of infecting young pigs, but that older animals are more resistant. The author considers, however, that this organism can develop in such animals since, on its injection into the scrotum of a pig, a local and general action was produced and living bacilli were isolated from the epididymus four months later. The author considers that the porcine strain of *Br. abortus* represents a modified form of the bovine strain which has become pathogenic for pigs.—J. A. N.

CARDONA, L. (1935). La brucellose expérimentale du chien. [**Experimental Brucella Infection in the Dog**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 131-134. [17 refs.] [In French].

Intravenous injection was found to be the best way of producing the disease in dogs, the temperature curves obtained resembling those of human undulant fever. Intermittent lameness without temperature reaction was a notable symptom. High blood serum agglutination titres may persist for 15 months. Loss in weight was a marked symptom. It was not possible to immunize dogs.—C. V. WATKINS.

MEYER, K. F. (1935). **Laboratory Infections due to Brucella in the United States.**—*J. Bact.* **29.** 43-44.

In 17 laboratories, 57 persons engaged in routine or research work with brucella have suffered from clinically recognizable infections with these organisms during the period 1922 to 1934. *Br. melitensis* was responsible for 53·8 per cent., *Br. abortus* (bovine type) for 3·9 per cent. and *Br. abortus* (porcine type) for 42·3 per cent. of the cases from which blood cultures were obtained.—A. BROWNLEE.

GARNIER, CHABRUN, J., & FASQUELLE-SAINT-YVES-MÉNARD, R. (1935). Fréquence des brucelloses chez les employés des abattoirs de Paris. [**Incidence of Brucellosis among Workers at the Paris Abattoirs**].—*Rev. Path. comp.* **35.** 596-601.

The authors describe five cases of brucella infection among workers at the Paris abattoirs ; a brucella organism was recovered by blood culture from four of the patients. In one case the organism proved to be *Brucella melitensis* ; the typing of the other strains has not yet been completed.—T. M. DOYLE.

OLIN, G. (1935). Studien über das Undulantfieber in Schweden. [**Undulant Fever in Sweden**].—*Svenska LäkSällsk. Handl.* **61.** 63-168. 27 figs., 44 tables. [185 refs.] [In German].

The frequency of cases of undulant fever in Sweden has remained practically unchanged during the last five years at about 120 a year, whilst the frequency of

contagious abortion amongst cattle is said also to have remained constant. In human beings, infection occurs slightly more frequently amongst men than amongst women, 65·2 per cent. out of 555 cases being males. There is no definite seasonal distribution of cases. The incidence amongst young children and aged people is low, whilst it is highest amongst the middle-aged. Elderly women appear to be more susceptible than elderly men. Generally speaking a high incidence of undulant fever occurred in districts where contagious abortion was rife or in districts drawing a milk supply from such an area. The number of cases of undulant fever per million inhabitants, or per million cows, was very much lower in Sweden than in Denmark, but higher than in Germany.

Latent infection in the human being, as well as allergy and immunity, are discussed. An allergic state was demonstrable by a cutaneous reaction. Only 21 out of 288 persons suspected of being infected showed positive cutaneous reactions, the highest incidence occurring in the age group of 20 to 40 years. Fifty-eight of the 288 persons gave agglutination reactions of 1 : 10 or higher, the highest incidence falling in the same age group. A rather higher incidence of positive reactors to these tests was noted amongst country dwellers than amongst town dwellers. Diagnosis by blood culture and by serological means was studied. *Brucella abortus* was cultivated from the blood of 46 per cent. of 251 cases, culture usually being more successful with patients running high temperatures. With serological tests the complement-fixation and agglutination reactions gave the most reliable results ; it appeared desirable to use the two tests in conjunction, as either alone gave a small percentage of erroneous results.

The antigenic structure of strains of brucella isolated in Sweden has been studied and discussed, and a clinical study of 171 cases of undulant fever is included. Chemotherapeutic and vaccine-therapeutic aspects of the subject receive consideration.—E. J. Pullinger.

Kerr, W. R., Lamont, H. G., & Shanks, P. L. (1935). **Methods Used in the Preparation of a New Type of Dead Anti-Abortion Vaccine. Bovine Uterine Fluid as an Enrichment Medium.**—*Vet. J.* **91.** 306-308. 1 table.

This article records the use of bovine uterine fluid in the preparation of a new form of dead anti-abortion vaccine which is giving satisfactory results in the field (uncontrolled). The methods of preparation of the culture medium and of the vaccine are described, together with a short account of limited results of its use.

In the cultivation of several types of organisms – staphylococcus, streptococcus, *Brucella abortus* (fresh strain), *Br. abortus* (old strain), *Salmonella pullorum*, *S. typhi* and *Corynebact. diphtheriae* – bovine uterine fluid has been found to have enrichment properties when added to the medium. It is more effective when incorporated with the medium than when added to the condensation water. The growth is stored according to a system, the details of which are given, in order to allow a proportion of the organisms to die naturally : dilute euflavine is then added.—P. L. Shanks.

Olitsky, P. K., Syverton, J. T., & Tyler, J. R. (1934). **Studies on the Etiology of Spontaneous Conjunctival Folliculosis of Rabbits. II. Bacteriological Investigations.**—*J. exp. Med.* **60.** 375-384. 11 figs. on 2 plates. [10 refs.]

The authors have previously described this condition as occurring in two clinical forms. The first is characterized by a dormant chronicity almost symptomless, with discrete lesions, and the second is a more actively progressive disease, presenting an inflammatory follicular reaction involving all the palpebral conjunctival surfaces. They conclude that the condition is caused by an infectious

agent which behaves after the manner of bacteria of low pathogenicity. The bacteriological investigations are described in the present paper. The species of bacterium isolated from folliculosis tissue was capable of producing conjunctival reactions, which were indistinguishable from the natural disease or from the condition induced by inoculation of folliculosis tissue, and was pathogenic for rabbits whether injected subconjunctivally or instilled into the conjunctival sac. The bacterium is classed as belonging to the same genus as *Bacterium granulosis* of human trachoma and *Bacterium simiae*, which is associated with follicular conjunctivitis of monkeys and chimpanzees. The generic name of *Noguchia* is suggested to the group, *N. cuniculi* having a causal relationship to rabbit folliculosis.—D. R. W.

Defosse, R. (1934). Du charbon post-partum dans l'espèce bovine. [**Post-Parturient Gas Gangrene of Cattle**].—*Thesis for Docteur vétérinaire, Lyons.* pp. 82. [55 refs.]

The author defines the above subject as a series of morbid conditions, evincing the same symptoms, but caused by various agents. It is a grave complication of parturition, leading to the formation of crepitating swellings in any part of the body, but principally in the external genital region, and, unless promptly treated, is usually fatal. Many bacteria may cause the condition, the most important being described together with typical lesions which some produce. Infection is generally mixed, and unless an organism predominates markedly, the lesion does not suggest its aetiology. Many bacteria are only markedly virulent through the interaction and aid of others. Injury predisposes to these infections, which occur in almost all parturients. Vaginal acidity is neutralized and this antiseptic property lost by lochial discharges. Closure of the os uteri, and the presence of any blood clots and debris and of damaged tissues favours anaerobic conditions. Tissue injury often leads to acute disease as the result of latent spores present in healthy tissue, an example being infection of the uterus following parturition injuries. Bacterial toxins may paralyse the defensive reflexes, neutralize phagocytes, and have an inhibitory action on the nervous system.

Symptoms and lesions, diagnosis and prognosis (more grave in young animals) are all described.

For treatment the author recommends careful prophylaxis, serum administration in suitable cases, surgical interference, the administration of general stimulants and the local use of oxydizing agents. The serum advocated is a mixture of sera prepared against *Clostridium welchii*, *Cl. septique*, *Cl. oedematiens* and *Cl. histolyticum*. Even if pathogenic aerobes cause the disease, this treatment will stimulate phagocytosis.—C. V. Watkins.

Henderson, D. W. (1935). **The Prophylaxis of Experimental** *V. septique* **Infection and the Practical Application of Antibacterial Methods.**—*Brit. J. exp. Path.* **16.** 393-405. 6 tables. [7 refs.]

Previous papers by Henderson have shown that the somatic or " O " antigen of *Clostridium chauvoei* and, to some extent, that of *Cl. septique*, afford protection to guinea pigs against artificial infection by activated spore suspensions of the respective organisms. Experiments on *Cl. septique* were believed to have been interfered with by the peculiar difficulty encountered in conferring immunity on guinea pigs and the present paper concerns similar experiments in rabbits. The immunizing values of repeated inoculations of toxoid were compared with those of corresponding " O " antigen derived from a quantity of culture 15 to 20 times greater than the amount of toxoid used. Immunity was distinctly superior in the " O " antigen group.

The second experiment was intended to afford comparisons of bacterial and antitoxic immunity conferred by *Cl. septique* toxoid, anaculture and boiled bacterial suspension (" O " antigen), the quantity of each antigen used being equivalent in terms of original culture. Immunity was conferred by the anaculture and by the " O " antigen but was barely demonstrable in the toxoid group. Serum from each group of rabbits was pooled and (1) tested for agglutinins for an " O " antigen ; (2) used to confer passive protection on guinea pigs and mice, and (3) absorbed with an " O " antigen and the absorbed sera used to confer passive immunity on mice. Immunity was estimated by intradermal inoculation of activated spore suspension. There was no appreciable difference in " O " agglutinin content in the sera from the anaculture and "O" antigen group, and none was detected in the toxoid group. Sera from the anaculture and " O " antigen groups protected guinea pigs against 10 certain infective doses [C.I.D.] of spore suspension while serum from the toxoid group afforded only traces of immunity against one C.I.D. The anaculture group serum protected mice against 1, 10 and 100 C.I.D. ; the " O " antigen group serum protected against ten C.I.D., and the toxoid group serum gave traces of immunity to one C.I.D. Absorption of the sera with "O" antigen destroyed the immunizing properties of the " O " antigen group serum, while the anaculture group serum was not perceptibly affected. However, toxoid group serum afforded no immunity under the same test conditions.—R. S. Roberts.

Débonéra, G., & Ananiadès, B. (1935). Les gastro-entéro-toxémies infectieuses (bradsot du mouton). [**Gastro-Entero-Toxaemias of Sheep**].—*Rev. gén. Méd. vét.* **44.** 385-408. 1 fig. [Numerous refs.]

The authors describe a disease of adult sheep in which the clinical manifestations, lesions and bacteriological findings correspond with those of the entero-toxaemia of sheep described in England under the name " struck " [McEwen & Roberts. – this *Bull.* **1.** 204]. Cases of the disease were investigated in several districts in Greece, and mortality continued from January to June or July. The rate of mortality varied, reaching percentages of 10, 20, 30 and even 45 in some flocks. Goats on the infected pastures did not contract the infection. *Clostridium welchii* (type B or C) was isolated from the heart blood, local oedema or bone-marrow in the majority of cases. [The title, gastro-entero-toxaemia, by which the authors designate the disease, does not appear justified. It is based upon the fact that in a few instances they isolated *Cl. septique* alone or together with *Cl. welchii* from their material and, although they are aware of the ease with which the former organism invades the tissues after death, reference being made to a publication on this subject, there is no assurance in the paper that the cases from which *Cl. septique* was isolated were uncontaminated. There is, in any case, no evidence that it had aetiological significance. The new title is intended to imply " entero-toxaemia and braxy ". The authors are unaware of some recent publications dealing with types of *Cl. welchii* and discuss the relation of the organism that they isolated to the classical type of *Cl. welchii* (type A)].—R. S. Roberts.

Bosworth, T. J., & Glover, R. E. (1935). **A Differential Character of** *Clostridium welchii* **Type D.**—*Proc. R. Soc. Med.* **28.** 1004-1006. [3 refs.]

This publication reveals a peculiar phenomenon associated with *Cl. welchii* type D toxin which could not be demonstrated with A, B or C toxins. When a known amount of *welchii* toxin type D was added to a filtrate of normal sheep intestinal contents and allowed to stand for one or two hours, the mixture was shown to contain a toxic element considerably in excess of the amount of D toxin added. In the case of mice, mixtures which were calculated to contain from one-thirtieth

to one-fortieth of a M.L.D. of D toxin were fatal. Parallel results were obtained in guinea pigs.

This reaction is apparently associated with a heat-stable fraction of the toxin and a heat-labile factor in the intestinal content.

Neutralization tests showed that antitoxin which protected against a given dose of D toxin also protected against that dose when mixed with filtrate of intestinal contents.—GWILYM O. DAVIES.

FILDES, P., & RICHARDSON, G. M. (1935). **The Amino-Acids Necessary for the Growth of *Cl. sporogenes*.**—*Brit. J. exp. Path.* **16.** 326-335. [17 refs.]

Clostridium sporogenes will grow in a medium containing various salts, " sporogenes vitamin ", thioglycollic acid and a number of amino-acids. Of the latter, tryptophane, leucin, phenylalanine, tyrosin and arginine are indispensable, while histidine, cystine, methionine and valine are highly important and possibly indispensable. These growth experiments support the conclusion of STICKLAND [(1934). *Bio-chem. J.* **28.** 1746, and (1935). **29.** 288 and 889.] that the sources of energy for this organism are derived from the simultaneous oxidation and reduction of certain pairs of amino-acids. The amino-acids used in this investigation were as far as possible synthetic preparations ; where natural samples were used the conclusions are regarded as tentative.—W. R. WOOLDRIDGE.

MERLING-EISENBERG, K. B. (1935). **Internal Structure of Bacterial Cells.**—*Brit. J. exp. Path.* **16.** 388-393. 3 text figs., 6 figs. on 1 plate. [13 refs.]

This article discusses briefly the theory of microscopy and ultramicroscopy. Dark field illumination is improved if organisms are dried on a slide, then immersed in oil and covered with a cover-slip. Certain organisms survive this treatment for a considerable time, during which period they may be examined in a more or less natural state.

In a further adaptation the organisms are suspended on slides in their natural aqueous medium. Rays of light selected by a dark ground condenser are then passed through an adjustable azimuth slit diaphragm. In this way the light can be focussed so as to fall obliquely upon the sides of an organism which presents only a small surface to incident light and causes but little diffraction. Consequently the bulk of light passes into the interior of the organism to illuminate any dense structure situated therein.—E. J. PULLINGER.

RODRÍGUEZ, T. (1934). Tienen las bacterias un ciclo evolutivo ? [**Have Bacteria a Developmental Cycle ?**].—*Rev. Hig. Sanid. pecuar.* **24.** 160-169. 2 tables.

A general discussion of the subject.

KOSER, S. A., & SAUNDERS, F. (1935). **Studies on Bacterial Nutrition. I. Separation of Growth Factors from Veal Infusion.**—*J. infect. Dis.* **56.** 305-316. 1 fig., 4 tables. [24 refs.]

The ability of veal infusion to support the growth of many bacteria (e.g. streptococci, pneumococci, *Corynebact. diphtheriae*, *Brucella abortus*, etc.) is largely removed by preliminary treatment with charcoal. The latter appears to adsorb certain factors essential for the growth of these organisms ; these factors can be recovered by elution of the charcoal with hot alcohol or hot acetone. The addition of aqueous solutions of these extracts, after removal of the alcohol or acetone, to the charcoal-treated veal infusion restored to this medium its power to support the growth of streptococci, etc. Addition of the charcoal extract to a synthetic medium consisting of a mineral salt solution containing cystine, trypto-

phane, asparagin and dextrose considerably increased the power of this medium to support the growth of certain of these bacteria. Little effect was obtained with solid media made from this synthetic solution. The growth-promoting activity of the extract is destroyed on ignition. It is believed that the extract contains essential growth factors of a vitamin nature.—W. R. WOOLDRIDGE.

GLADSTONE, G. P., FILDES, P., & RICHARDSON, G. M. (1935). **Carbon Dioxide as an Essential Factor in the Growth of Bacteria.**—*Brit. J. exp. Path.* **16.** 335-348. 1 fig. [42 refs.]

The authors have investigated the effect of the continuous passage of carbon dioxide-free gases through cultures of *Salmonella typhi*, *Bact. coli*, *Pseudomonas pyocyanea*, *Staphylococcus aureus*, *Bacillus subtilis*, *B. anthracis*, *Corynebact. diphtheriae*, *Clostridium sporogenes* and *Cl. welchii*. Under certain conditions this process entirely inhibited the growth of the organisms, whilst under other conditions, e.g., in the presence of a readily oxidizable substrate such as peptone or broth, growth was not arrested. Inhibited cultures were not dead. The results of the various experiments described support the conclusion that the inhibition was due to the rapid removal of CO_2 from the liquid cultures, and that failure to inhibit was due to the production of CO_2 by the organisms at a greater rate than that at which it could be removed by gassing; this CO_2 was probably produced by the bacteria themselves before growth, mainly by oxidation of a substrate. The authors suggest that the presence of CO_2 in a culture medium is a prerequisite to bacterial growth, either aerobic or anaerobic.—W. R. WOOLDRIDGE.

DIENES, L. (1935). **Production of Amorphous Extra-Bacterial Substances in Bacterial Cultures. I. Observations with Oerskov's Milk Bacillus. II. Observations with Various Bacteria, Especially with Gram-Positive Aerobic Spore-Bearing Bacilli.**—*J. infect. Dis.* **57.** 12-21 and 22-45. 5 figs. [14 refs.]

This is a detailed account of a phenomenon which has been previously recorded by the author [this *Bull.* **5.** 264]. It relates to the production of excessive amounts of capsular substances which do not represent simple secretions or metabolic products as they are capable of independent multiplication. The author has only found one other organism, a Gram-negative bacillus isolated from the lung of a dead guinea pig, besides Oerskov's milk bacillus and those of the *subtilis* group, which showed this phenomenon.—GWILYM O. DAVIES.

BELONOVSKY, G. D., & KALININE, A. M. (1935). **Acidophile Bacteria of the Digestive Tract of New-Born Calves and their Importance in the Prophylaxis of White Scours.**—*Sovyet. Vet.* No. 2. pp. 54-59. [2 refs.] [Abst. from French summary].

The authors find that acidophile bacteria appear in the digestive tract of healthy new-born calves in small numbers one or two days after birth, gradually increase in numbers from the fifth to the eighth day and predominate when the normal flora of the digestive tract has established itself. They are mainly of the "smooth" type. In new-born calves which die of white scours the acidophile bacteria found in the digestive tract in nearly three-quarters of the cases are of the "rough" type. The employment of these organisms in white scours prophylaxis gives good results. The best effect, however, is obtained with organisms of the "smooth" type.—C. DAVENPORT.

YEN, A. C. H., & KUROTCHKIN, T. J. (1935). **The Preparation of Specific Bacterial Carbohydrate Substances by Electrolysis.**—*J. infect. Dis.* **56.** 238-249. 2 figs., 4 tables. [6 refs.]

When saline suspensions of bacterial or yeast cells, mixed with an equal volume of Dakin's solution, are subjected to the passage of a strong direct current, they undergo lysis and the suspensions become progressively clearer. This is due to the action of sodium hypochlorite formed during electrolysis. During lysis the specific bacterial carbohydrates are released and are dissolved in the clear fluid. These water-soluble substances were recovered by the authors [methods described] and found to be polysaccharides which react with specific antiserum to a high titre.

The authors compare the preparation of these carbohydrates by electrolysis with the well-known alkaline extraction method and find that, in the case of Friedländer's bacillus, electrolysis is the more efficient method, but that in *Monilia tropicalis* the reverse is the case.—GWILYM O. DAVIES.

DURANT, A. J., & TUCKER, C. M. (1935). **Aspergillosis of Wild Turkeys Reared in Captivity.**—*J. Amer. vet. med. Ass.* **86.** 781-784. 3 figs.

The disease appeared in turkey poults at five days of age, and the mortality rate reached its maximum when they were about 15 days old. In three weeks the epizootic had subsided spontaneously. Of 785 poults, less than 200 survived.

Samples of the commercial food were proved to be heavily infected with *Aspergillus fumigatus*. The infected mash was autoclaved at 20 lb. pressure for three hours, after which the fungus could not be isolated.—NORMAN DOBSON.

MELLO, A. (1935). Um caso de esporotrichose verrucoide por *Sporotrichum Beurmanni*. [**Sporotrichosis in a Mule**].—*Rev. Industr. anim.* **2.** 305-314. 8 figs. on 4 plates. [14 refs.] [French summary : abst. from orig.]

The author gives a brief review of the literature dealing with *Sp. beurmanni* infection and describes a case of sporotrichosis reported in South America in a 15-year-old mule. The animal was well-fed and in good condition. The lesions consisted of suppurative foci, in front of the trachanter of the right femur, in various stages of development. There was no swelling of the lymphatic glands or ducts.

Mello describes the microscopic appearance of the pus and gives the results of culture in Sabouraud's medium. Inoculation into a rat of cultures obtained from scarified material from the back resulted in the formation of small abscesses which also revealed long and short Beurmann and Gourgerot forms.

DISEASES CAUSED BY PROTOZOAN PARASITES.

—. (1934). **The Interrelation of the Parasites of Domestic and Wild Animals.**—*Rep. Wyo. agric. Exp. Sta. 1933-1934.* p. 29. [Copied *verbatim* from *Exp. Sta. Rec.* **72.** 689].

Brief reference is made to the infestation of tame rabbits following grazing on areas frequented by wild rabbits and to the acute injury to sheep caused by *Sarcocystis tenella*.

KUBO, M. (1934). **Investigations of Amoebic Dysentery. IV. Experimental Studies on Amoebic Dysentery in Dogs.**—*J. orient. Med.* **21.** 987-999. 9 figs. [15 refs.] [In Japanese : abst. from pp. 113-114 of English absts.].

On the rectal injection of dogs with cultured amoebae, a profuse flow of mucus resulted which prevented the parasites from reaching the mucous membrane. In circumscribed areas, there was a decrease in mucus, and these areas were attacked by the amoebae, with resultant necrosis, shrinkage and the formation of cracks, through which the organisms penetrated, invading the submucous layers as far as the muscularis mucosae.—U. F. RICHARDSON.

SIMIĆ, T. (1935). Infection expérimentale du chat et du chien par *Entamoeba dispar* et *Entamoeba dysenteriae*. Réinfection et immunité croisée du chien. [**Experimental Infection of the Dog and Cat with** *E. dispar* **and** *E. dysenteriae*. **Reinfection and Cross-Immunity in the Dog**].—*Ann. Parasit. hum. comp.* **13.** 345-350. [5 refs.]

Continuing his work on the differentiation of *E. dispar* and *E. dysenteriae*, two species of amoebae of man which differ mainly in pathogenicity, the author records the infection of cats and dogs with these parasites. Young cats were readily infected and both species caused a fatal disease. Young dogs were found to be susceptible to both species of amoeba, whilst old dogs resisted attempts to infect them with *E. dispar* but proved susceptible to *E. dysenteriae*. *E. dispar* infection in the dog was mild, whilst *E. dysenteriae* infection sometimes resulted in fatal disease. Dogs recovered from infection with one species proved immune to that species, but susceptible to infection with strains of the other organism.
—U. F. RICHARDSON.

MANRESA, M. (1935). **Studies on Surra : I. The Outbreak of Surra in 1933 in the College of Agriculture.**—*Philipp. Agric.* **23.** 749-757. 6 tables. [4 refs.]

MANRESA, M., & GONZALEZ, B. M. (1935). **Studies on Surra : II. Natural Recovery from Surra Infection among Oxen and Water Buffaloes.**—*Ibid.* 859-879. 4 tables. [16 refs.]

MANRESA, M., & GONZALEZ, B. M. (1935). **Experiments on Surra.**—*J. Amer. vet. med. Ass.* **87.** 31-36. [7 refs.]

These three articles deal with observations and experiments in connexion with an outbreak of surra which occurred at the College of Agriculture, Laguna, Philippine Islands. The evidence suggests that the source of the outbreak was a water-buffalo which had been sent for treatment to the College of Veterinary Science at a time when experiments on the treatment of surra were in progress. Local spread at Laguna is attributed to transmission by *Tabanus striatus* which is prevalent at all seasons of the year.

Cattle, buffaloes and horses developed the disease, whilst sheep, goats and pigs escaped infection. Acute and subacute cases occurred in cattle and buffaloes, one animal dying within 24 hours of the first appearance of symptoms. Affected animals showed febrile symptoms, the temperature being highest in the early stages when trypanosomes were present in the peripheral blood. Complement-fixation tests showed that 60·34 per cent. of the cattle and 42·85 per cent. of the buffaloes were affected. In no case were trypanosomes detected in the blood of animals negative to the complement-fixation test. Some herds escaped infection entirely, and some animals running in infected herds also escaped infection. [The latter fact is quoted as evidence of individual resistance, but such animals may have recovered before testing was adopted]. Case records have been accumulated tending to show that definite recovery may occur in cattle and buffaloes, without treatment, with complete disappearance of trypanosomes from the body tissues of the host. Complete recovery was judged to have occurred if the blood was negative to daily microscopic examination for four weeks, if large quantities of blood failed to infect laboratory animals, and if a negative reaction was obtained with the complement-fixation test. In both cattle and buffaloes such recoveries were recorded at periods varying from seven to 12 months after detection of infection. It is mentioned that other cases of surra have been observed in which recovery occurred in one month.—U. F. RICHARDSON.

RUSSEFF, C. (1935). Der Einfluss der Milzextirpation auf den Verlauf der Dourineinfektion bei verschiedenen Versuchstieren. [**The Influence of Splenectomy on Dourine in Experimental Animals**].—*Z. ImmunForsch.* **84.** 295-299. [11 refs.]

These experiments were undertaken to ascertain if splenectomy would lead to such an increase of trypanosomes that they could be obtained in large quantities for use as antigen in serological tests. The animals were inoculated with blood containing trypanosomes and the spleen was removed immediately after inoculation. Splenectomized dogs lived an average of 8·6 days as opposed to 76·6 days in controls, and the removal of the spleen in animals showing little peripheral infection led to a marked increase in the peripheral trypanosomes. Guinea pigs, mice and rats showed a slight loss of resistance after the removal of the spleen, but in rabbits the operation had no recognizable effect.—U. F. RICHARDSON.

RANDALL, R. (1935). **Isolation of Trypanosoma hippicum from the Cerebrospinal Fluid of Infected Horses.**—*Vet. Bull. U.S. Army.* **29.** 204.

Cerebrospinal fluid obtained from two horses which five weeks previously had received intravenous inoculations of *T. hippicum* was found to be infective. Trypanosomes were not demonstrated microscopically in the fluid, but inoculated rats showed a heavy infection.—G. NORMAN HALL.

LAUNOY, L. (1935). Influence de l'âge sur la résistance des souris à l'infection par le *Trypanosoma congolense.* [**The Influence of Age on the Resistance of Mice to** *T. congolense*].—*C. R. Soc. Biol. Paris.* **119.** 1033-1035. 3 tables. [2 refs.]

Forty-two mice, varying in age from 12 to 140 days, were inoculated with *T. congolense*, their resistance being judged by the number of days they survived and the number of cases, in each age group, which assumed the chronic form. The greatest resistance appeared to exist in the groups varying in age from five to 12 weeks and weighing from 17 to 24 g. Very young mice, fed by their mothers, survived longer than those fed artificially.—U. F. RICHARDSON.

KLIGLER, I. J., & COMAROFF, R. (1935). **Susceptibility and Resistance to a Trypanosome Infection. IX. Active Immunization of Rats and Guinea-Pigs and Passive Immunization of Rats to a Trypanosome Infection.**—*Ann. trop. Med. Parasit.* **29.** 145-160. 8 tables. [24 refs.] [For abst. of previous article of this series, see this *Bull.* **2.** 605].

This article records experiments carried out to ascertain the mechanism of immunization by injections of dead trypanosome suspensions, and to ascertain whether sera containing trypanolytic antibody were capable of conferring passive immunity. In rats, the injection of dead trypanosome suspensions increased the period of incubation, and also prolonged the course of the disease, but failed to provoke any marked production of lytic antibody. In guinea pigs, 20 injections of dead trypanosome suspensions failed to influence the incubation period or the course of the disease. The injection of dead trypanosomes caused the production of a lytic antibody in rabbits. Sera taken from guinea pigs and cats after a trypanosome crisis contained a lytic antibody, but failed to prevent the infection of rats, although they delayed the onset of infection. [It is not stated what trypanosome was used in these experiments].—U. F. RICHARDSON.

PFEIFFER, C. C., & TATUM, A. L. (1935). **A New Experimental Approach to the Study of the Rêle of the Reticulo-Endothelial System in the Cure of Trypanosomiasis.**—*J. Pharmacol.* **53.** 358-376. 2 figs., 1 table. [20 refs.]

This article records experiments on the action of " mapharsen " (the " arsenoxide " of arsphenamine) on *Tryp. equiperdum* and the influence of the reticulo-endothelial system, spleen and liver. The time between the administration of a standard dose of " mapharsen " and the disappearance of trypanosomes from the blood of rats was found to be entirely dependent upon the degree of infection, judged by the ratio of trypanosomes to red blood corpuscles. If rats with an average infection rate (one trypanosome to 20 red corpuscles) are treated with 5 mg. of " mapharsen " intravenously, the trypanosomes normally disappear in 15 minutes. If the animal is killed five minutes after treatment, or if blood is drawn into a test tube, the disappearance time is increased to about 75 minutes. On a test of the infectivity of organ pulp after the disappearance of the trypanosomes from the circulation, it was found that the liver retained infective parasites longer than other organs and, from exclusion experiments, it also appeared that the liver had the greatest influence on cure. The authors suggest that the trypanosomes are intoxicated and then removed from the circulation by the sensitized liver cells. That these cells must be sensitized is indicated by the fact that trypanosomes from treated animals can infect a new host. *T. rhodesiense* requires more of the arsenical preparation to remove it from the circulation than *T. equiperdum*, and it is suggested that it may have greater resistance to the reticulo-endothelial system, or that it has less power of provoking the spleen to the production of antibodies.—U. F. R.

RANDALL, R. (1935). **The Mercuric Chloride Test in Equine Trypanosomiasis (*T. evansi*) and Glanders (*A.* [*sic*] *mallei*).**—*Vet. Bull. U.S. Army.* **29.** 255-261. 2 tables. [4 refs.]

This article records experimental work carried out in the Philippines to ascertain the reliability of the mercuric chloride test, in comparison with the complement-fixation test, for detecting surra in horses and mules. Whilst a group of 47 infected animals all gave positive or suspicious readings with the complement-fixation test and 20 controls all gave negative readings, with the mercuric chloride test there were 18 positive, 16 suspicious and 11 negative readings with the infected group, and one positive result in the control group. On the other hand, when using serum from animals infected with glanders, the complement-fixation and the mercuric chloride tests gave approximately similar results.—U. F. RICHARDSON.

DE COURSEY, A. (1935). **The First Fatal Case of Chaga's Disease observed on the Isthmus of Panama.**—*Amer. J. trop. Med.* **15.** 35-40. 3 figs. on 1 plate. [9 refs.]

In the course of this article, which deals with the human infection, the author refers to CLARK and DUNN (1932) who, while searching for reservoir hosts of *Tryp. cruzi*, found one dog to be infected.—U. F. RICHARDSON.

DONATIEN, A., & LESTOQUARD, F. (1935). Notes sur la leishmaniose viscérale canine. **[Notes on Canine Visceral Leishmaniasis].**—*Bull. Soc. Path. exot.* **28.** 426-431. [9 refs.]

From observations on 21 cases of canine visceral leishmaniasis in Algeria the authors emphasize the long time that can elapse between the demonstrable infection of a dog and the appearance of recognizable symptoms of disease. They also confirm that in all cases of visceral leishmaniasis the parasites are present in the skin, but their detection may require a long search. In their experience, a positive formol-gel test indicates undoubted leishmanial infection, the opacity being of greater importance than the gelification. They also found that the serum-flocculation test, carried out with distilled water, was reliable for the detection of canine leishmaniasis.—U. F. RICHARDSON.

NATTAN-LARRIER, L., & NOUGUÈS, S. (1935). Les variations du tropisme de *Leishmania donovani* chez les diverses espèces sensibles. [**Variations in the Tropism of** *L. donovani* **in the Various Species of Susceptible Animals**]. —*C. R. Soc. Biol. Paris.* **119.** 987-989. [1 ref.]

The authors point out that, whilst the liver and spleen are invaded by leishmanial parasites in all species of animals, the secondary organs vary according to the species of the host. For instance, the cornea is frequently attacked in dogs but never in man. Similarly, though the macrophages are the principal cells invaded in all animals, the liver cells may be invaded in some animals, the endothelial cells in others, and the cells of the connective tissue in others.—U. F. RICHARDSON.

PAPANTONAKIS, E. (1935). **Observations on Leishmaniasis in the District of Canea (Crete).**—*Ann. trop. Med. Parasit.* **29.** 191-197. 3 graphs, 1 plan. [9 refs.]

This paper deals with the prevalence of human leishmaniasis in Crete, where both the intestinal and the cutaneous forms of the disease exist. Many cases of human infection were reported to be associated with the existence of " sickness and emaciation " in dogs, and the wholesale destruction of stray dogs for rabies in 1933 appeared to lead to a reduction of infantile disease.—U. F. RICHARDSON.

CARPANO, M. (1935). La leishmaniose canine en Egypte. [**Canine Leishmaniasis in Egypt**].—*Bull. Off. int. Hyg. publ.* **27.** 548-549.

Canine leishmaniasis has not been encountered in Egypt, but the author considers that it may be absent from the towns yet exist in the villages. In Egypt, human visceral leishmaniasis resembles the Asiatic form, kala azar, rather than the infantile form of the Mediterranean area. *Babesia canis* is prevalent in dogs and *B. gibsoni* has been detected, but appears to be rare.—U. F. RICHARDSON.

DONATIEN, A., & LESTOQUARD, F. (1934). Investigación de la leishmaniosis canina por las reacciónes serológicas. [**Serological Reactions in Canine Kala Azar**].—*Med. Países cálidos.* **7.** 486-487. [1 ref.]

For some time the authors have used the formol-gelification method in their diagnosis of canine kala azar. A positive reaction is indicated if gelification takes place in less than an hour. The opalescence and opacity of the serum are also important factors. If the reaction is slow, no opalescence occurs. In some diseases of dogs in which cachexia and anaemia are present and in cases of extensive suppuration there is also no opalescence.

The reaction is not, however, specific, as it is obtained in certain trypanosome infections in Algiers, such as débab in camels and dourine in horses. A definite diagnosis of kala azar can be given if it takes place in less than an hour and if the serum is opalescent and opaque.

The urea-stibamine reaction of Chopra and Das Gupta is more rapid than the formol-gelification test, but not so simple.

Brahmachari's distilled water reaction has been used simultaneously with the formol-gelification test at the Pasteur Institute, Algiers, for diagnosis and to check progress in dogs receiving treatment with antimony, stybial and " neo-stibosan ".

EMMERSON, M. A. (1935). **Trichomoniasis in Relation to Reproduction in Dairy Cows. (Second Report).**—*Vet. Ext. Quart. Univ. Pa.* **35.** No. 59. pp. 19. 2 figs., 1 table. [30 refs.]

The author defines trichomoniasis of cattle as a protozoan invasion of the genitalia, thought to be capable of producing early abortions, pyometra, cervicitis,

vestibulo-vaginitis and temporary sterility in females, and inflammation of the prepuce and glans penis with subsequent diminution of sexual desire in the male ; it is considered to be caused by *Trichomonas foetus* of Riedmüller. The report gives a description of the morphology, reproduction and cultivation of the organism, and concludes with notes on the distribution, symptoms and treatment as seen in the United States of America. With regard to treatment, the author considers that cows recover without any attention, but in cases of pyometra, recommends expression of the corpus luteum and injection of pituitrin, followed by douching with sodium bicarbonate.—U. F. RICHARDSON.

HEYMACH, A. (1935). Beitrag zum Vorkommen von Trichomonaden im kranken und gesunden Uterus geschlachteter Rinder. [**The Occurrence of Trichomonads in the Diseased and Healthy Uteri of Cattle**].—*Inaug. Diss. Giessen.* pp. 36. 1 table. [29 refs.]

This thesis records investigations carried out at the Mainz abattoir to ascertain the prevalence of trichomonad infection of cattle. 370 animals were examined and 9·46 per cent. were found to be infected. Of 217 apparently healthy uteri, eight exhibited a trichomonad infection though no other evidence of disease could be detected even microscopically. Thirty cases of pyometra were examined and 83 per cent. showed trichomonad infection. It was a common experience for uterine examination to reveal trichomonad infection when vaginal examination was negative, and the author suggests that the vagina rarely harbours the parasites unless it is contaminated with exudate from the uterus. Before declaring an animal free from infection it is important that a uterine sample should be examined. —U. F. RICHARDSON.

KÜST. (1935). Die Uebertragung des Geschlechtstrichomaden des Rindes. [**The Transmission of Genital Trichomonad Infection in Cattle**].—*Dtsch. tierärztl. Wschr.* **43.** 513-514. [29 refs.]

This article draws attention to the influence, on the spread of trichomonad infection, of bulls which have passed the acute stage of the disease, exhibit no symptoms, yet may still harbour the parasites. It may be impossible to detect trichomonads either in the preputial secretion, bladder, urethra, testicle, seminal vesicle or seminal duct, and yet trichomonads may occasionally be found in the semen, and the animals may still be infective. Cows served by such bulls do not develop vestibulitis, but the organisms pass to the uterus with the semen, and set up a chronic endometritis associated with sterility and repeated periods of heat. Cows infected in this way only show a trichomonad infection at the time of heat, and they are also more difficult to cure than animals showing the usual acute form of the disease.—U. F. RICHARDSON.

GWÉLÉSSIANY, J. (1935). Une nouvelle espèce de coccidie des bovidés *Eimeria thianethi* n.sp. [**A New Species of Coccidium in Bovines,** *E. thianethi*].—*Ann. Parasit. hum. comp.* **13.** 338-341. 1 fig., 2 tables.

A description is given of coccidial oocysts observed in small numbers in the faeces of cattle in Georgia ; they are concluded to be those of a new species, for which the name *E. thianethi* is proposed. They are easily distinguished from oocysts of other bovine coccidia by their dimensions ($42 \times 28\mu$), possession of a micropyle, thick, cross-striated capsule and by their pale yellow colour. The oocysts were not in sufficient numbers for cultural observation. [In view of the latter fact the allocation of the parasite to the genus *Eimeria* would appear presumptive].—R. S. ROBERTS.

YAKIMOFF, W. L. (1935). Coccidien der Rinder in der Schweiz. [**Bovine Coccidiosis in Switzerland**].—*Schweiz. Arch. Tierheilk.* **77.** 361-366. 4 figs., 3 tables.

The author reviews a considerable part of the literature on bovine coccidiosis, its relationship to coccidiosis of rabbits and its history in Switzerland, the country in which it was first detected. From specimens of faeces of calves suffering from diarrhoea sent by RIEDMÜLLER the author was only able to isolate the two species *Eimeria zurni* and *E. smithi*. For treatment, 1·5 to 1·9 g. of " ichthargan " given three times a day by the mouth, is recommended.—U. F. RICHARDSON.

YAKIMOFF, W. L., & KONEFF, Z. P. (1935). Piroplasmose der Rinder in Westsiberien. [**Bovine Piroplasmosis in Western Siberia**].—*Berl. tierärztl. Wschr.* **51.** 549-550. 1 fig., 1 table. [2 refs.]

The authors describe a piroplasm encountered in smears from a cow at Omsk, Western Siberia, in which area, except for theileria infections, no bovine piroplasmosis had previously been detected. The organism is said to differ from *Babesia bovis* in that all the parasites were situated in the centre of the red corpuscles, and it therefore resembles the group of organisms which Yakimoff places in the subgenus *Françaiella*. The pear forms resembled *F. colchica*, but the presence of band forms indicated *F. occidentalis*. It is suggested that a mixed infection might have been present, but that no definite opinion as to species can be given until the biological characteristics have been investigated. The ticks, *Dermacentor marginatus* and *D. silvarum* are prevalent in the area, but the invertebrate vector has not yet been determined.—U. F. RICHARDSON.

JAUFFRET, R. (1934). Contribution à l'étude des hémosporidioses bovines au Cambodge. [**Bovine Piroplasmosis and Anaplasmosis in Cambodia, Indo-China**].—*Bull. écon. Indochine.* **37.** 695-702.

This paper records the detection of anaplasma, theileria and babesia infections in old cows at Kep in Indo-China. The cases occurred in very old cows after a period of three months of drought. The administration of adrenalin to 15 other animals of the herd failed to reveal infection in young animals, but one eight-year-old cow showed anaplasma and theileria. The author concludes that diseases due to piroplasms are enzootic, and only become evident in old weak animals when exposed to adverse conditions, such as drought. He stresses that many animals of this herd were of Indian breed, and that they appear to resist tropical diseases as successfully as the native animals, whilst cattle from Europe appear to be very susceptible.—U. F. RICHARDSON.

YAKIMOFF, W. L. (1935). Sur la prémunition par les espèces de piroplasmidés. Répartition géographique du Françaiella caucasica Yakimoff et Belawine 1926. [**Premunition in Piroplasmosis. Geographical Distribution of *F. caucasica***].—*Ann. Soc. belge. Méd. trop.* **15.** 291-294.

In this note the author records observations which he brings forward as evidence that *F. caucasica* is a true species. Cattle recovered from *Babesia bigemina* infection proved susceptible to françaiella infection, and a cow which had recovered from *B. bovis* infection under treatment developed a françaiella infection a month later and died. *F. caucasica* is said to differ from *B. bovis* in that it occupies a central position in the corpuscle, and in that it is not susceptible to treatment with trypan blue. This species is said to be prevalent in White Russia over the same area as *B. bovis*. [An open mind should be kept on this question ; the françaiella infection recorded may have been a relapse to the babesia infection which had been temporarily controlled by treatment].—U. F. RICHARDSON.

DONATIEN, A., LESTOQUARD, F., & BOUGUET, A. (1935). Nouveau cas de transmission de *Piroplasma caballi* de la mère au foetus. [**A Case of the Transmission of** *Babesia caballi* **from Mare to Foetus**].—*Bull. Soc. Path. exot.* **28.** 422-423. [2 refs.]

In 1934 Donatien and other workers observed an intra-uterine infection of *B. caballi* [see this *Bull.* **4.** 713]. A second case is now recorded in a young mule. The animal was ill from birth and died three days later. Icterus was not present but spleen smears revealed the existence of *B. caballi.* Parasites were not seen in the mare's blood. The authors consider that icterus of the young, or the condition more aptly called " congenital piroplasmosis of the young ", may be caused by *B. caballi* as well as by *B. equi.*—G. NORMAN HALL.

ROSSI, P. (1935). La réaction de Fulton chez les chevaux atteints de piroplasmose vraie (*Piroplasma caballi*). [**Fulton's Reaction in Equine Piroplasmosis**]. —*C. R. Soc. Biol. Paris.* **119.** 681-682. [3 refs.]

The author investigated the behaviour of 29 sera from horses infected with *Babesia caballi* when submitted to Fulton's mercuric chloride test ; 30 per cent. of these sera gave positive reactions with mercuric chloride at a dilution of 1 : 70,000 or higher. It is concluded that this test has no value in distinguishing equine infectious anaemia from equine piroplasmosis.—U. F. RICHARDSON.

I. PURVIS, G. B. (1935). **East Coast Fever – A Warning.** [**Correspondence**]. —*Vet. Rec.* **15.** 280-281. [2 refs.]

II. HORNBY, H. E. (1935). **East Coast Fever – A Warning.** [**Correspondence**]. —*Ibid.* 476.

III. COWIN, G. S. (1935). **East Coast Fever.** [**Correspondence**].—*Ibid.* 656-657.

IV. PURVIS, G. B. (1935). **East Coast Fever.** [**Correspondence**].—*Ibid.* 685-686.

I. The first letter criticizes the Tanganyika veterinary report for 1933 and the belief that immunity to East Coast fever is permanent. The writer claims that cattle removed from an enzootic area lose their immunity, and that dipping in enzootic areas has an initial inappreciable effect, followed by an increased mortality in the younger animals. He suggests that the heavy calf mortality in enzootic areas, ascribed to East Coast fever, may be exaggerated, and deprecates measures of eradication based on South African experience which was obtained under different conditions of disease incidence and climate to those obtaining in tropical Africa.

II. The second letter points out that the veterinary authorities of Tanganyika Territory are not blindly following the lead of South Africa, and quotes paragraphs from the Annual Report for 1934 which show that eradication by dipping is only recommended in certain areas, whilst investigations are proceeding into data concerning the incidence of ticks, the effect of varying vegetation, the calf mortality in different enzootic areas, the value of immunity acquired in one area against disease in another, and generally into the whole East Coast fever position in every part of the territory.

III. Cowin claims that repeated attacks of East Coast fever in calfhood do confer a durable immunity to the disease, and he defends the correctness of the estimate of a calf mortality of 50 per cent. from this disease in Tanganyika. From experience of dipping in areas of heavy rainfall, he considers that under such conditions dipping will not eradicate ticks, but is beneficial in that it reduces their

numbers. In an area of low rainfall, dipping has definitely decreased calf mortality in native cattle.

IV. Purvis argues that immunity is maintained by repeated infection, as evidenced by the loss of immunity in cattle removed from an enzootic area, and that a series of attacks in calfhood is therefore evidence of low enzooticity. He suggests that if all cases of East Coast fever were put into a small fenced area the enzooticity might be increased and the calf mortality reduced.—U. F. RICHARDSON.

NICOLAU, S., & KOPCIOWSKA, L. (1935). Toxoplasmose spontanée du chien. [**Spontaneous Toxoplasma Infection in the Dog**].—*Bull. Soc. Path. exot.* **28.** 490-498. 4 figs. [24 refs.]

This article records observations on a toxoplasm infection encountered in a young dog which had been inoculated subdurally with dog distemper virus. Macroscopic observation failed to reveal lesions but histological examination revealed a toxoplasm infection of the brain, spinal cord, spleen, liver, suprarenal capsule, lymphatic glands, lungs, small intestine and heart. The parasites were most numerous in the upper part of the small intestine, where almost every epithelial cell was invaded, the mesenteric lymphatic glands and the lungs. They occurred in cysts of various sizes formed in the cytoplasm of cells which were usually of the epithelial, endothelial or monocytic types ; occasionally single free parasites were encountered. The lung parenchyma was seeded with small nodules, invisible to the naked eye, about eight to ten nodules per c.mm., containing more or less voluminous parasitic cysts.

In the brain two centres of necrosis were detected containing degenerated neuroglia cells, and an infiltration of monocytes and polymorphonuclear cells. The liver was not heavily infected, and the toxoplasms had not invaded the hepatic cells, but were contained in monocytes.

The parasites appeared to be devoid of both blepharoplast and centrosome, but are described as multiplying both by binary fission and by schizogony. The lesions encountered in this case of canine infection closely resemble those described in toxoplasmosis of rabbits, guinea pigs and mice.—U. F. RICHARDSON.

NICOLAU, S., & KOPCIOWSKA, L. (1935). Infection expérimentale des petits oiseaux avec le *Toxoplasma canis*. [**Experimental Infection of Birds with** *T. canis*].—*C. R. Soc. Biol. Paris.* **119.** 976-979. [8 refs.]

This article records the infection of sparrows, weaver birds, pigeons and fowls with a strain of *T. canis* which had been passaged through mice. Infection could be produced by subdural, intraperitoneal or subcutaneous inoculation and sometimes by oral administration. The two smaller species of birds succumbed to the infection whilst the pigeons and fowls survived. The authors consider that avian toxoplasms, *T. gondii*, and the toxoplasms of dogs, rabbits, guinea pigs and mice, although presenting a different appearance in different hosts, are probably a single species.—U. F. RICHARDSON.

DONATIEN, A., & LESTOQUARD, F. (1935). Existence d'*Eperythrozoon ovis* en Algérie. [**The Existence of** *E. ovis* **in Algeria**].—*Bull. Soc. Path. exot.* **28.** 423-426.

The authors record investigations into the characters of a strain of *E. ovis* discovered in a sheep in Algeria. The parasites were inoculable to goats and sheep, causing in the former a brief invasion of the blood, and in the latter a heavy blood invasion which persisted in some animals for several months, but in neither case did any rise in temperature occur. The persistence of the parasites

was revealed by splenectomy, or by the relapses which occurred with superimposed infections, such as anaplasmosis. The organisms occurred in the red blood corpuscles or free in the plasma, and they appeared as dots about 0·25 to 0·33μ in diameter, staining a pale pink with Giemsa.—U. F. RICHARDSON.

DISEASES CAUSED BY VIRUSES.

BASSET, J., NICOLAU, S., & MACHEBOEUF, M. A. (1935). L'action de l'ultra-pression sur l'activité pathogène de quelques virus. [**The Effect of High Pressures on the Pathogenic Activity of Viruses**].—*C. R. Acad. Sci., Paris.* **200.** 1882-1884.

The viruses of rabies, herpes, yellow fever, foot and mouth disease and Borna disease were submitted to pressures varying from 1,000 to 7,000 atmospheres for periods of 30 minutes with the following results. The herpes virus was inactivated at 3,000 atm. That of foot and mouth disease was attenuated at 3,000 atm. and rendered avirulent at 4,000 atm. Rabies virus was attenuated at 4,000 and inactivated at 5,000 atm. Yellow fever virus withstood a pressure of 3,000 atm. and that of Borna disease 6,000 atm. The latter was inactive after 30 minutes' exposure at 7,000 atm.

These results support the view that viruses are not related to either enzymes or toxins, both of which withstand pressures of 10,000 atm.—GWILYM O. DAVIES.

VERGE, J., & GORET, P. (1935). Essai de classification des infections animales à ultra-virus. [**The Classification of the Filtrable Viruses**].—*Rev. gén. Méd. vét.* **44.** 261-265. [3 refs.]

It is difficult to devise a rational classification of the group of filtrable virus diseases. Verge and Goret have endeavoured to solve the problem by taking into consideration the embryological origin of the tissues attacked, the pathogenic action of the viruses and the electivity which they manifest for different parts of the body. Their main headings are represented by the following schema :–

- A Naturally pathogenic viruses
  - I Visible and filtrable
  - II Cytotropic
    - α Ectotropic
      - 1 Cytocinetic
      - 2 Cytolytic
        - a Neurotropic
        - b Dermotropic
        - c Dermo-neurotropic
      - 3 Mixed
    - β Endotropic
      - 1 Respiratory affinity
      - 2 Alimentary affinity
    - γ Mesotropic
    - δ Bacteriotropic
  - III Viruses awaiting classification
- B Saprophytic viruses, experimentally pathogenic

—R. E. GLOVER.

CURASSON, G. (1935). Recherches sur la péripneumonie bovine. [**Research on Bovine Contagious Pleuro-Pneumonia**].—*Rec. Méd. vét. exot.* **8.** 65-70. [8 refs.]

This article consists of notes collected since 1923 and published now in view of their possible utility in the campaign against bovine contagious pleuro-pneumonia in French West Africa. Observations are quoted indicating that the incubation period may be as long as two and a half months, and that animals may contract the disease and develop lung sequestrae without having exhibited any recognizable symptoms. In one case a serious engorgement of the walls of the rectum and terminal intestine was encountered, the liquid from the lesion being infective to a calf on subcutaneous inoculation. Experiments carried out on the diagnosis of cases by complement-fixation or allergic reactions have not given satisfactory results, and attempts to sterilize vaccine by the addition of " chinosol " 1 : 3,000 resulted in destruction of the virus in 15 days. Intratracheal and intravenous injections of infected lymph failed to produce infection or to confer immunity. Buffaloes reacted to subcutaneous inoculation of virulent lymph, but giraffes, various species of buck, sheep, goats and rabbits all proved insusceptible.—U. F. RICHARDSON.

TURNER, A. W. (1935). **A Study of the Morphology and Life Cycles of the Organism** *Pleuropneumonia contagiosa boum* (*Borrelomyces peripneumoniae* **nov. gen.) by Observation in the Living State Under Dark-Ground Illumination.**—*J. Path. Bact.* **41.** 1-32. 102 figs. on 6 plates, 5 diagrams. [53 refs.]

Unlike many previous observers who studied this organism in surface colonies, the author observed the growth of the organism by dark-ground illumination in the living, unfixed, growing state in fluid culture.

The medium used almost exclusively is that referred to as V.F.-O.S. (details given) and the strains used were isolated in Queensland from diseased cattle within the previous two years.

According to Turner's observations, this organism has at least five methods of reproduction which he refers to as " genethodes ". These genethodes do not occur in any distinct order, in fact a certain amount of overlapping occurs and transitions take place from one to the other. These factors are probably responsible for the complicated hypotheses previously put forward by other observers.

The final viable stage of growth which preponderates in old cultures is a filter-passing, spheroidal, resting form or spore which he calls a " conidioid ". The conidioids are approximately 0·2 to 0·4μ in diameter and frequently show indentations which are responsible for extreme variations in shape. These forms are probably identical with the initial corpuscles of LEDINGHAM.

One method of reproduction, which is regarded as the commonest, is by endomycelial fragmentation. The conidioids become solid and more refractile, and extrude one or more delicate flexible germinal tubes which may grow to a length of 190μ, the original conidioid being eventually absorbed. The tubes show dichotomous and sympodial branching and finally undergo complete fragmentation into streptococcus-like chains of spherical elements which become conidioids.

Genethode II is characterized by the appearance along the length, or at the ends of filaments, of distinctly larger forms which look like discs with bright refractile rims and poorly refractile centres. The disc-like appearance is only seen when they roll over. At a number of points (1 to 8) on the periphery of each disc short rodlets grow out conveying the appearance of cogwheels. These " asterodiscules " are probably the " asterococci " of BORREL. The radiating peripheral rods continue to grow at the expense of the original discule until a mycelium is formed and the discule is no longer visible. The filaments fragment

producing " exoconidioids " which, when free, increase in size and become indistinguishable from conidioids.

Genethode III is a process of multiplication by budding. Some of the spherules which arise from conidioids during germination, give rise at several points on the circumference to granules which are extruded but remain attached to the mother cell by delicate filaments conveying a satellite appearance. The granules become daughter spherules and subsequently behave as conidioids.

Genethode IV was only observed once in its typical form. In this process, oval spore-like bodies are formed from long filaments which appear to arise in a mass of granular material fringed by clubbed forms.

In Genethode V, forms occur which resemble those described by SMILES. Conidioids give rise to long cylindrical rods about 4μ long by $0{\cdot}4\mu$ wide and these, by a process of constriction, give rise to short chains of spherical, oval, cylindrical or other shaped forms which may become free or remain attached by these filaments.

A remarkable and characteristic feature of this organism is its amazing faculty for quick growth and change of shape. The author has not been able to recognize a stage of sexual reproduction. In cattle freshly dead from pleuro-pneumonia, he has been able to demonstrate in the pleuritic fluid forms similar to those found in culture, but has only seen evidence of genethodes I, II and possibly V.

The author concludes by discussing the phylogenetic relationship of the organism and considers that Bergey's classification should be extended to include within the class *Schizomycetes*, another order, namely *Borrelomycetales*, into which both this organism and that of contagious agalactia would fall. The suggested name is *Borrelomyces peripneumoniae*.—GWILYM O. DAVIES.

I. BEMELMANS, E. (1932). Vergleichende Untersuchungen über das Wesen der Grippe des Menschen, der sog. Brustseuche (Grippe) des Pferdes und der Staupe (Grippe) des Hundes. [**Comparison of Human Influenza, Equine Contagious Pneumonia and Distemper of Dogs**].—*Ergebn. Allg. Path. path. Anat.* **26.** 612-710. [345 refs.]

II. LÜHRS, E. (1933). Einige Bermerkungen zu den vergleichenden Untersuchungen über das Wesen der Grippe des Menschen, der sogen. Brustseuche (Grippe) des Pferdes und der Staupe (Grippe) des Hundes von E. Bemelmans, Den Haag. [**Comparison between Human Influenza, Equine Influenza and Dog Distemper**].—*Z. InfektKr. Haustiere.* **44.** 218-227. [2 refs.]

I. This article is a lengthy comparative review of the literature concerning certain aspects of these diseases. As such it is extremely difficult to reduce for abstraction without grave distortion, and readers are referred to the original article.

Equine contagious pneumonia (influenza pectoralis) is a febrile catarrhal inflammation of the upper respiratory tract which symptomatically, both in its simple and complicated forms, resembles endemic human influenza. In spite of extensive efforts the artificial transmission of this condition from horse to horse has not yet been really successful, nor has the addition of cultures of *Haemophilus influenzae* to the inoculum assisted in the production of the disease. Similarly, in the human being, *H. influenzae* probably has no aetiological significance, though evidence in this connexion is conflicting.

Both endemic human influenza and equine influenza pectoralis are local rather than general infections, such general symptoms as occur being due to the spread of noxious substances from the local site of infection. The causal agents

of these diseases, probably filtrable viruses, are primarily pathogenic for nervous tissue and all other lesions are secondary. Thus, as a result of disturbance of nervous stimuli, a hyperaemic condition is produced in the lungs which predisposes to bacterial invasion of the tissues with the onset of pneumonia. As regards secondary invaders, it has already been stated that *H. influenzae* plays no important role; the same remark applies to certain protozoa which have been incriminated. In the opinion of the author, certain diplostreptococci should be regarded as probable secondary invaders which, acting in combination with the specific filtrable virus, produce the train of symptoms known as influenza. He also considers that this diplostreptococcus may play a similar role in distemper of dogs.

II. A critical comment on the above, too long and detailed to abstract usefully. It is a most important paper and should be read in the original.

[The nomenclature of the diseases of the horse that can be classified roughly under the term " influenza " is most unsatisfactory. EDWARDS has recently – this *Bull.* **5.** 714. – given a good historical review of the important research work, mostly German, as a result of which the position is now much clearer. EDWARDS gives prominence to the transmission experiments carried out by Lührs and his co-workers, in which bronchial exudate from influenza pectoralis was infective to horses when applied to the nostrils or mouth.

It is perhaps convenient to use the names influenza pectoralis (contagious equine pneumonia) and influenza catarrhalis "pink eye" for two of the important entities and, as far as possible, to avoid the use of most of the other current terms.

The French nomenclature is perhaps the most inconvenient for English readers. Their term " fièvre typhoïde " is often used very loosely and sometimes, in addition to covering influenza pectoralis and influenza catarrhalis, apparently even covers equine infectious anaemia. COLLETTE [see below] actually introduced the term " fièvre paratyphoïde " because the condition he was describing was not " fièvre typhoïde ", not because it was related to a paratyphoid type of bacillus.

The following table gives some of the commonly used terms] :–

	Influenza catarrhalis.	Influenza pectoralis.
English.	Equine influenza. "Pink eye".	Equine influenza. Contagious equine pleuro-pneumonia.
German.	Pferdestaupe.	Brustseuche.
French.	Fièvre typhoïde.	Grippe des equidés.

—E. J. PULLINGER.

COLLETTE, H. (1934). Considérations sur les affections typhoïdes du cheval. Etude d'une paratyphose équine. [**The Typhoid Affections of Horses. A Study of Equine Paratyphoid**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 85. [38 refs.]

This paper is a detailed account of an outbreak of disease in the horses of a regiment of cavalry of the French army, for which the author, apparently without justification, uses the term " equine paratyphoid fever ". In a period lasting five months, 202 cases of the disease occurred among a total of 771 horses. There were no deaths. The symptoms shown by the majority were of a mild

character amounting to nothing more than loss of energy and appetite, and low fever of short duration – in some cases complicated by slight pulmonary symptoms. The source of infection could not be established. The author blames the French army method of bedding horses, i.e. the accumulation of soiled litter in standings, as the chief factor in the spread of the disease. In the treatment of cases, considerable use was made of novarsenobenzol and " sulpharsenol ", with very satisfactory results. The paper ends with a lengthy discourse on differential diagnosis and the probable nature of the condition with which the author was dealing. As his efforts to transmit the disease by blood inoculation failed, he concludes that the virus of influenza catarrhalis (" pink eye ") was not present. [See BEMELMANS – above].—C. DAVENPORT.

PANISSET, L. (1935). Essai de systématique des affections typhoïdes du cheval. A propos de recherches récentes. [**Classification of the Equine Diseases of the Influenza Type in the Light of Recent Researches**].—*Rev. gén. Méd. vét.* **44.** 141-145. [9 refs.]

The author refers to the difficulties of classifying diseases of the influenza-catarrhal fever type in the horse and the extensive nomenclature list which exists. He points out that the work of CARRÉ and VALLÉE has enabled equine infectious anaemia to be excluded definitely from this group. Again, the association of the virus of POELS and BASSET with " pink eye " (influenza catarrhalis) has made further differentiation possible. The author considers that the situation is capable of yet further clarification in view of the recent researches of WALDMANN in connexion with the causal agent of infectious bronchitis (Hoppegarten cough). Accordingly, he submits a new classification list of these diseases which he gives in the form of a table of three columns as follows :– (1) name of disease and synonyms ; (2) causal agent, and (3) characteristic clinical manifestations.—C. D.

SHOPE, R. E. (1934). **A Change in the Contagious Character of a Strain of Swine Influenza.**—*J. Bact.* **27.** 82-83.

The association of the filtrable virus of swine influenza and *Haemophilus influenzae suis* produces a highly contagious and severe disease. Under experimental conditions, however, one strain of the disease became extremely mild, simulating a pure virus infection. This appeared to be due to a suppression of *H. influenzae suis* in the respiratory tract of infected pigs and not to a change in the character of the virus.

It was also noted that pigs, which were carriers of *H. influenzae suis*, acquired severe influenza and not the mild filtrate disease when exposed to this old stock strain of virus.—R. E. GLOVER.

TERPSTRA, J. I. (1935). Het voorkomen van influenza bij varkens in Nederland. [**Swine Influenza in the Netherlands**].—*Tijdschr. Diergeneesk.* **62.** 177-186. [English, French and German summaries : abst. from orig.]

In Holland, young pigs are affected with a disease which bears a resemblance clinically and anatomically to swine influenza seen in America [SHOPE & LEWIS] and " Ferkelgrippe " in Germany [KÖBE]. From lesions in the respiratory tract of such pigs, the author was able to cultivate *Haemophilus influenzae* in pure culture or together with pasteurella or cocci. *H. influenzae* can be present for a considerable time without causing clinical symptoms. These cultures only present pathogenic properties for white mice when injected in combination with cultures of pasteurella or cocci. The disease could be induced in pigs four to six weeks

old by injecting into the nasal cavity a mixture of *H. influenzae* culture, and a filtrate of lung tissue from clinical cases of swine influenza in the lungs of which pasteurella and cocci were present. Other similar test pigs which were given lung filtrate or *H. influenzae* culture alone did not become ill and were found healthy when killed after three weeks. The author states that it has not yet been proved that the virus of " Ferkelgrippe " is not a modified swine fever virus.
—J. VAN DER HOEDEN (UTRECHT).

SÁLYI, J. (1935). Adatok az Aujeszky-féle betegség kórszovettanához. [**The Pathological Histology of Aujeszky's Disease**].—*Allatorv. Lapok.* **58.** 23-25. 3 figs. [8 refs.] [Abst. from German version in *Arch. wiss. prakt. Tierheilk.* **69.** 55-60].

A histological examination was made on the brains from four pigs which had died of the disease and also on three rabbits and one sheep which had been infected by the subcutaneous route. The lesions which were observed in the brains of the pig, were in the nature of a non-purulent encephalitis and had a certain similarity in type to those found in swine fever. The most important changes found were a diffuse and perivascular infiltration of lymphocytes and monocytes, plasma cells and polymorphs being scarce. Occasionally the endothelium of small blood vessels was swollen and haemorrhages in the neighbourhood of such vessels were observed. Glial proliferation occurred in the vicinity of the lateral ventricles. Although such lesions were quite evident microscopically, the brains appeared more or less normal to the naked eye.

No lesions were observed in the artificially infected rabbits or sheep which might be ascribed to the rapid course of the disease after infection. [Reference should also be made to the paper by HURST – this *Bull.* **4.** 349. – and to KÖVES, & HIRT – this *Bull.* **5.** 72. – the latter being a full account of the disease and of investigations carried out in Hungary].—J. R. M. INNES.

—. (1934). **Pseudorabies in Cattle.**—*J. trop. Med.* (*Hyg.*). **37.** 326-328.

A general description of Aujeszky's disease in cattle, with reference to the symptoms and diagnosis of the condition. The nature of the changes induced in rabbits, guinea pigs, etc., by artificial infection is also noted.—R. E. GLOVER.

COSTA, M. H. (1933). Contribución al estudio del mal de caderas de los bovinos. II. Estudio experimental del virus y la vacuna. [**Experimental Study of the Virus of Rabies (South American) of Bovines, and Vaccination against the Disease**].—*Rev. Hig. Sanid. pecuar.* **23.** 5-24. [16 refs.]

The identity of the virus of rabies (South American) of bovines with that of rabies, as postulated by QUIROGA, ROTTGART, ACOSTA, MASSELIN and SCASSO is questioned by the author, whose experiments appear to show that the virus is modified from its original state to that of the classic rabies virus by animal passage.

Although inoculation with fixed rabies virus appears successfully to confer immunity against rabies (South American) in bovines, the inoculation of a mixture of one part cerebral filtrate and three parts blood serum, both from an affected animal, is advised. The inoculation is made in the side of the neck, and is followed by a more or less intense local reaction which disappears in four or five days. It is most important that the inoculation should be strictly subcutaneous, and not intradermal or intramuscular. [See also this *Bull.* **3.** 25].—NORMAN BISSET.

DEBELIĆ, S. (1935). Bjesnoća (lyssa) kod zivotinja u Jugoslaviji. [**Rabies in Animals in Yugoslavia**].—*Vet. Arhiv.* **5.** 368-372. 2 tables, 1 chart. [Abst. from German summary]. C

Official statistics in Yugoslavia show that, during the five years 1924 to 1928, the number of cases of rabies rose steadily. The disease was present continuously in 32 departments and only one department was free.

REMLINGER, P., & BAILLY, J. (1935). Comment procéder à l'expertise d'un virus rabique fixe ? [**Criteria for the Valuation of Fixed Rabies Virus**].—*Bull. Inst. Pasteur.* **33.** 609-617.

In spite of its name, " fixed " rabies virus is far from being fixed. The authors review the variations in behaviour exhibited by some fixed viruses after a large number of rabbit passages, and suggest that, as the term " fixed " tends to inspire a false sense of security, " passaged " virus might be a more suitable name. After many rabbit passages some fixed strains become more sensitive to desiccation and glycerin, and less sensitive to dilution and ether treatment. Obviously such changes are of paramount importance in vaccine preparation as, unless the values of the viruses in these respects are periodically assessed, a diluted or ether-treated vaccine may be too strong, or a dried or glycerinated vaccine too weak. The lines of examination of a fixed virus are discussed, including symptomatology, desiccation, glycerination, dilution, ether and antiseptic treatment, pathogenicity tests, and tests to prove the protective power of the vaccine. The authors point out that, although standardization of fixed virus was recommended by the First International Rabies Congress, nothing has been done, and that it is the duty of every institute concerned to carry out regularly its own tests. In conclusion they mention that, despite contrary opinions, they incline to the belief that no protective power against street virus is lost by mutation to fixed virus and many subsequent passages.
—NORMAN HOLE.

JAUFFRET. (1935). Compte rendu sur une campagne de vaccination antirabique. [**Account of an Antirabic Vaccination Campaign (Indo-China)**].—*Bull. Soc. Sci. vét. Lyon.* **38.** 116-130. [3 refs.]

This paper is a record of a canine antirabic inoculation campaign carried out in Indo-China between May and July, 1934. A formolized vaccine was employed and in all 385 dogs were vaccinated. The intention was to give three doses to each animal with an interval of three weeks between doses and this was effected in the majority of cases, though not without difficulty. A serviceable degree of immunity was conferred, but the author stresses the urgent need for the perfection of a single-dose method of immunization.

Fatalities following inoculation are considered under three headings, *viz.* death from naturally acquired rabies in the incubative stage, inadequate immunity ascribable to underdosage with vaccine, and post-vaccinal paralysis.

The result of the campaign in its broader sense, namely, its effect on the incidence of disease in the territories concerned, is not dealt with.—C. DAVENPORT.

MARINESCO, G., DRAGANESCO, S., & STROESCO, G. (1933). Recherches histo-pathologiques sur la maladie des jeunes chiens (maladie de Carré). [**Canine Distemper**].—*Ann. Inst. Pasteur.* **5.** 215-236. 15 figs. on 15 plates. [22 refs.]

A detailed and well-illustrated account of the changes found in the central nervous system in canine distemper.

The characteristic picture was a wide-spread perivascular infiltration of all parts, both of grey and white matter, of the brain and spinal cord, particularly of the base of the cerebrum. This encephalomyelitis can arise from infection both by the nasopharyngeal and vascular routes. The original text should be consulted for the details.—J. E.

—. (1935). La peste porcine en Yougoslavie. [**Swine Fever in Yugloslavia**].—*Bull. Off. internat. Epiz.* **10.** 341.

A summary is given of the number of farms and the number of pigs on them that have been inoculated against swine fever by the simultaneous method during 1934 in Yugoslavia. All healthy in-contact pigs on the infected premises and all pigs on neighbouring farms are inoculated. The inoculations are carried out by the State and the inoculated pigs are isolated for 21 days.—N. H. Brooksbank.

Agoulnik, M. A., Dobrovsky, G. M., & Kiseleff, E. B. (1935). **Bacterial Invasion of Pigs used as Virus Carriers and Serum Producers for Swine Fever.**—*Sovyet. Vet.* No. 1. pp. 49-56. 9 tables. [Abst. from French summary].

This is a study of the extent of bacterial invasion suffered by pigs when used as virus and serum producers for swine fever. A bacterial examination of carcasses made in 231 cases showed that paratyphoid organisms were present in 7·6 per cent. of the virus producers and 10·9 per cent. of the serum producers. Muscle, glands and marrow, however, were rarely involved and, in the virus producers, muscle and marrow were always sterile. Amongst other organisms also encountered were " paracolon " bacilli and *Bact. coli.* Serum producers were always more heavily involved than virus producers. 20 per cent. of the organisms isolated proved pathogenic for white mice. No toxic material was ever found.—C. Davenport.

Wsewolodoff, B. (1935). **Pathological Changes in Swine Fever.**—*Bull. Moscow vet. Inst.* **1.** 24-48. [9 refs.] [Abst. from German summary].

The pathological-anatomical changes resulting from pure forms of swine fever appear very shortly after infection, in some cases within a couple of days. Early changes include serous inflammation and hyperaemia of the mucosa of the intestine and also oedema and congestion of the lymphatic glands and parenchymatous organs. More advanced changes include the formation of haemorrhagic foci in the lymph glands, mucosa of the stomach and in the spleen, kidneys and other organs. Such lesions are fully developed by the eighth to tenth day. Fibronecrotic lesions of the intestinal tract and lungs cannot be considered as characteristic for diagnostic purposes.—E. J. Pullinger.

Agoulnik, M. A., Dobrovsky, G. M., & Kiseleff, E. B. (1935). **The Biochemical and Physiochemical Properties of Meat of Pigs Infected with Swine Fever.** —*Sovyet. Vet.* No. 1. pp. 57-64. 9 tables. [Abst. from French summary].

The carcasses of 56 pigs, virus and serum producers of swine fever, stored under various conditions of low temperature, ice chamber, etc., were submitted to tests with regard to their biochemical properties. Whole carcasses, halves and joints were all employed. Extracts of the meat were also examined with reference to their physiochemical properties.

The authors found that the formation of lactic acid was somewhat retarded at the start but reached normal in two or three days. The pH of the meat was raised. The experiments enabled the authors to fix the procedure of preservation. —C. Davenport.

Michalka, J. (1935). Die Ergebnisse der Vaccination bei Schweinepest in Oesterreich. [**Results of Vaccination against Swine Fever in Austria**].—*Arch. wiss. prakt. Tierheilk.* **69.** 145-148. [2 refs.]

Geiger, W. (1935). Stellungnahme zu der Erwiderung Michalkas. [**Vaccination against Swine Fever. Reply to Michalka**].—*Ibid.* 229.

Michalka gives the results of vaccination against swine fever in Austria in 1933 and 1934 and contests GEIGER's assertion [this *Bull.* **5.** 574.] that his vaccine is dangerous.

Reports on 12,000 animals in 227 herds are available. Of 7,409 piglets in badly infected farms, 938 died up to the time of weaning; this represents a loss from swine fever, after vaccination, of 12·6 per cent. In another large pig-raising centre 4,287 piglets were vaccinated twice; 247 piglets (5 per cent.) died between the two vaccinations and 53 (1 per cent.) after the second vaccination. Of 1,161 piglets "vaccinated on account of general unthriftiness", 79 (6·8 per cent.) died, whereas previous losses had varied between 25 and 50 per cent. Of 225 pigs vaccinated for protective purposes in outbreaks already present, 143 (63·5 per cent.) died.

Replying to GEIGER, the author offers these statistics as evidence of the safety of his vaccine and suggests that GEIGER's experimental conditions may not have been above reproach.

In the second paper Geiger denies the above allegations.—J. E.

HUPBAUER, A. (1935). Zur Frage der Immunität und Immunisierung von Saugferkeln gegen Virusschweinepest. **[Immunization of Piglets against Swine Fever].**—*Wien. tierärztl. Mschr.* **22.** 229-237. 5 tables. [5 refs.]

A group of 573 piglets, from 13 different farms, were inoculated against swine fever by the simultaneous method when five to eight weeks old. Doses of serum varied between 20 and 25 c.c. and virus between 2 and 3 c.c. Only one of these piglets showed any noteworthy reaction to the vaccination, and this particular animal was heavily infected with ascarids. Healthy piglets, after recovery from the reaction, also showed normal growth during the weeks immediately following vaccination. Simultaneous vaccination with virus and antiserum resulted in a strong immunity of seven to nine months' duration.—E. J. PULLINGER.

FLÜCKIGER, G. (1935). Die Immunotherapie der Virusschweinepest. **[Immunization against Swine Fever].**—*Schweiz. Arch. Tierheilk.* **77.** 349-360. [4 refs.]

This article is a general discourse upon preventive inoculation against swine fever. It is concluded that it is desirable to produce an active immunity and that it is best effected by the simultaneous injection of living virus and antibody. The article contains long extracts from publications by other workers who have made useful progress in this field of research.—E. J. PULLINGER.

TRAUB, E., & TEN BROEK, C. (1935). **Protective Vaccination of Horses with Modified Equine Encephalomyelitis Virus.**—*Science.* **81.** 572.

A strain of equine encephalomyelitis virus was passaged serially for many generations through pigeons and then into two lambs to give a quantity of virus. This virus was now found to be incapable of producing symptoms in horses when introduced by the subcutaneous route but could still infect, though less surely, when inoculated intracerebrally. This modified virus protected guinea pigs in most cases against subsequent infection with unmodified virus, and also protected four out of nine horses against an intracerebral inoculation of unmodified virus.
—A. BROWNLEE.

I. SHAHAN, M. S., & GILTNER, L. T. (1935). **Equine Encephalomyelitis Studies. I. Cross-Immunity Tests between Eastern and Western Types of Virus.**—*J. Amer. vet. med. Ass.* **86.** 764-772. 4 tables. [4 refs.]

II. RECORDS, E., & VAWTER, L. R. (1935). **Equine Encephalomyelitis Cross-Immunity in Horses between Western and Eastern Strains of Virus. Supplemental Report.**—*Ibid.* 773-777. [5 refs.]

I. This is a description of cross-immunity tests between eastern and western types of the virus of infectious equine encephalomyelitis. The experimental animals comprised a calf and a sheep in addition to horses. Animals were immunized to one type of virus and later were tested for immunity to the other by intracerebral inoculation.

Three western virus-immune horses, exposed intracerebrally to eastern virus, developed typical encephalomyelitis and had to be destroyed. Of 18 eastern virus-immune horses inoculated intracerebrally with western virus, 17 developed typical encephalomyelitis. The calf and the sheep, immune to one type, were found still to be susceptible when tested intracerebrally with the other. The evidence obtained confirms previously reported observations in guinea pigs that eastern and western types of equine encephalomyelitis virus are immunologically different.

II. This supplemental report to a previous paper is a record of cross-immunity tests on 11 horses which were presumably immune to western encephalomyelitis virus as a result of immunization or were survivors from the experimentally induced disease. Eight of these were found to be resistant to the eastern type of virus. With guinea pigs, serum protection and cross-immunity tests led the authors to conclude that eastern and western strains of virus could be placed in separate immunological groups and, in this respect, the evidence differed from that which was obtained when the experiments were carried out in horses. They state, however, that such differences between eastern and western types of viruses may be only a variation in the degree of virulence rather than a specific immunological dissimilarity. In one intranasally infected horse, virus was present in the blood in amounts infective for guinea pigs from the 48th until the 144th hour after inoculation ; in one intracerebrally infected, virus was present in the blood from the 48th until the time of death at the 120th hour and, while present in the blood, virus could be recovered from the mucoid nasal discharge. D. R. WILSON.

ROSENBUSCH, F. (1934). La inmunización activa con el virus de la encefalomielitis infecciosa equina en la Argentina. [**Active Immunization against Equine Encephalomyelitis in the Argentine**].—*An. Soc. rur. argent.* **68.** 373-375.

The author carried out experiments with the Argentine and Californian viruses of equine encephalomyelitis and found that they are biologically similar, but that the Argentine virus is less virulent. The two viruses have similar pathogenic qualities and can infect mice, rats, pigeons, guinea pigs, horses, goats and rabbits. Fowls, pigs and sheep are not susceptible.

The experiments showed that animals recovered from encephalomyelitis have a strong and lasting immunity. Material from the brain should be used for the preparation of vaccines ; liver and kidney materials do not provide good antigens. Small quantities of the Argentine virus injected subcutaneously or intradermally conferred a lasting immunity in horses. They completely recovered eight to ten days after suffering from a mild attack.

Owing to the difficulty in obtaining live virus at the time required, the author used phenol, chloroform or saponin to produce a killed virus. He found, however, that immunity was only conferred by suspensions in which the virus was alive.

HOWITT, B. F. (1934). **Propagation of Virus of Equine Encephalomyelitis after Intranasal Instillation in the Guinea Pig.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 58-60. 1 table. [6 refs.]

2 c.c. of a 20 per cent. suspension of California virus was dropped into the nares of several series of small guinea pigs, and the animals were destroyed by bleeding from the heart at intervals varying from four to 120 hours after being given the virus. From these guinea pigs, suspensions of the filtered nasal mucosa, and unfiltered blood, cervical lymph glands, olfactory bulbs, maxillary and submaxillary salivary glands and various other parts of the brain were inoculated intracranially into healthy guinea pigs.

Virus was first detected in these tissues in the sequence in which they are here given. The virus was detected in the blood at the eighth hour, whereas it was not found in the olfactory bulb until the 18th hour and in the brain generally only after the 21st hour.

Removal of the olfactory bulb one week previously did not prevent infection by the intranasal route. Administration of virus by the digestive tract did not produce the disease.—A. Brownlee.

Didier. (1934). La peste du cheval en Afrique Occidentale Française. [**Horse-Sickness in French West Africa**].—*C. R. Acad. Agric. Fr.* **20.** 1023-1025.

African horse-sickness has been known in French West Africa since its colonization, and chiefly attacks imported horses or those in depressed health from any cause. It is most prevalent at the end of the rainy season, i.e. in September and October, and no fresh cases occur from January onwards into the first half of the new year. Light coloured horses and mules are more frequently affected than those with dark skin. Didier believes that African horse-sickness and heartwater in sheep are closely related aetiologically. Chemotherapy and convalescent serum therapy have not given very encouraging results [see also this *Bull.* **5.** 554].—J. E.

von Mócsy, J. (1935). Immunizálási es gyógyítási kísérletek fertozo kevésvéruségben beteg lovakkal. [**Experiments on the Immunization and Cure of Horses Suffering from Infectious Anaemia**].—*Allatorv. Lapok.* **58.** 58-62. [6 refs.] [Abst. from *verbatim* translation in *Dtsch. tierärztl. Wschr.* **43.** 211-214].

Attempts have been made to produce an immunity against infectious anaemia by the use of formolized virus. Concentrations of formalin of 0·3 to 0·5 per cent. killed the virus in blood or spleen tissue or destroyed its virulence in 38 to 74 days. Virulent serum so treated produced no immunity when injected two to four times at ten-day intervals, doses of 50 to 150 c.c. being used. Large inoculations of normal bovine serum, formalin, and of Lugol's iodine all failed to produce any curative effect when injected into animals suffering from infectious anaemia. —E. J. Pullinger.

Robinson, E. M. (1933). **The Outbreak of Foot and Mouth Disease at Germiston.** —*J. S. Afr. vet. med. Ass.* **4.** 173-177. [1 ref.]

This is a detailed account of the history, symptoms and method of diagnosis adopted in an outbreak of foot and mouth disease on a farm near Germiston, South Africa. Owing to the danger of taking material away from the farm for diagnosis, experimental inoculations were undertaken on the premises. Guinea pigs injected intradermally with vesicle material became infected with localized and generalized lesions. Two pigs and a calf, injected intramuscularly and intranasally with blood, remained apparently healthy.—Gwilym O. Davies.

Janssen, L. W. (1934). Over mond- en klauwzeervirus. I. Het neerslaan van het virus met alcohol en aether. [**Precipitation of Foot and Mouth Disease Virus by Alcohol and Ether**].—*Versl. werkzaam. Staatsveearts. Onderzoek.-*

inst. 1933-1934. pp. 108-119. 2 tables. [8 refs.] [English, French and German summaries : abst. from orig.]

JANSSEN, L. W., & BASS, E. (1935). Das Niederschlagen des Virus der Maul- und Klauenseuche mit Alkohol und Aether. [**The Precipitation of Foot and Mouth Disease Virus with Alcohol and Ether**].—*Münch. tierärztl. Wschr.* **86.** 373-377. 2 tables. [9 refs.]

The nature of filtrable viruses is discussed and the resistance of foot and mouth virus to external environment is studied. Virus survives ether extraction for as long as two hours. An alcohol-ether mixture in a proportion of 7 : 3 was innocuous to virus when a solution was allowed to act, in 90 per cent. concentration for 48 hours. Strengths greater than this gradually diminished the virulence of the virus. Dehydrated virus resisted the action of absolute ether at temperatures of −10°C. and +30°C. for many hours. Dry virus also resisted the action of dry heat of 70°C. for 30 minutes. The actual process of dehydration slightly reduced the virulence of the virus.—E. J. PULLINGER.

JACOTOT, H., & LE ROUX, G. (1935). Essai de traitement de la peste bovine. [**The Treatment of Rinderpest**].—*Bull. Soc. Path. exot.* **28.** 360-363. [4 refs.]

These experiments on the treatment of rinderpest consisted of intravenous injection of camphorated alcohol, animal charcoal and rinderpest vaccine material. Only the first method appeared to have any beneficial effects, and all the eight calves treated recovered whilst all four control calves died. This treatment was commenced in either the incubation stage or the very early stage of the disease, and comprised three injections on consecutive days, totalling 150 c.c. of absolute alcohol and 4 g. of camphor.—U. F. RICHARDSON.

JUGE, R. (1935). De la protection conférée au cheptel indochinois contre la peste bovine par le vaccin avirulent à base de pulpes d'organes. [**Immunization against Rinderpest in Indo-China with Avirulent Organ Pulp Vaccine**].—*Thesis for Docteur vétérinaire, Lyons.* pp. 88. 8 tables. [33 refs.]

This thesis discusses the value of vaccination against rinderpest, and endeavours to correlate the results obtained in field practice with those obtained by laboratory experiment. The vaccine used in Indo-China is made from the organs of calves, slaughtered on the eighth day after inoculation, 0·8 per cent. of formol being added. This formolized vaccine will only keep for one month and, recently, a toluene vaccine which will keep for three months has also been utilized. Laboratory experiments are recorded from which the author concludes that immunity is not conferred by vaccination before ten to 12 days, and does not persist for more than five months. Field observations on 33,217 vaccinated animals are considered to indicate that immunity is not conferred before the 20th day and does not persist for more than four months. The author suggests as the explanation of this discrepancy that, in the laboratory experiments, the vaccine was injected in two places which is impossible in the field owing to rough conditions and lack of time. It is interesting to note that vaccine prepared from buffaloes did not prove more valuable in those animals than vaccine prepared from cattle. [No detailed experiments are recorded].

In general the disadvantages of vaccine immunization are said to be the delay in the appearance of immunity, the short duration of immunity and the fact that only a certain percentage of the vaccinated animals are immunized (variously estimated at 70 per cent. to 86 per cent.).

An interesting discussion on the mechanism of vaccination immunity is

included in the thesis, and it is suggested that the immunity may resemble " premunity ", and largely depend upon persistence in the body of antigenic bodies introduced with the vaccine.—U. F. RICHARDSON.

CÈBE, J., & PERRIN, J. (1934). Degré de résistance conféré par la vaccination préventive contre la peste bovine. Essai de traitement de la maladie. [**The Resistance Conferred by Vaccination against Rinderpest. Attempted Treatment of the Disease**].—*Bull. écon. Indochine.* **37.** 1225-1230. 4 tables.

An outbreak of rinderpest is recorded amongst some newly purchased buffaloes which had been introduced into a mixed herd of cattle and buffaloes vaccinated against rinderpest four months previously. The infected animals were introduced on July 3rd, and the original herd was revaccinated on July 18th. Out of 88 vaccinated buffaloes, only five contracted infection, and out of 172 cattle only two contracted infection. All these animals recovered, though the mortality in unvaccinated animals was 50 per cent. Since no cases of infection developed after July 21st, it is argued that the vaccination on July 18th could not have affected the result, as no immunity would have been produced in three days. Treatment of the unvaccinated animals was attempted with large doses of serum or lymph from hyperimmunized animals, but as the mortality reached 50 per cent. the benefit was doubtful. The treatment with lymph did not appear to be more successful than treatment with serum.—U. F. RICHARDSON.

LUPU, A. (1935). Gastro-enterita contagioasă a pisicilor. [**Contagious Gastro-Enteritis in Cats**].—*Arhiva vet.* **26.** 189-215. 4 figs., 4 charts. [15 refs.] [Abst. from French summary].

Infectious gastro-enteritis is a wide-spread illness of cats in Europe and in North America. In Rumania, a serious epidemic occurred from August to December, 1933, and another from August, 1934, to February, 1935. The author gives the symptoms of five different types :- (1) peracute ; (2) acute ; (3) nervous ; (4) hyperpyrexic, and (5) atypical forms seen in kittens under two months old and in old cats.

The disease is easily reproduced, especially in cats three to six months old, by cohabitation and by feeding or inoculating with organs or filtrates of organs. There is a great difference in the virulence of strains of the virus. Some of them require a period of incubation of seven to ten days, others 14 days and some four days only. These strains maintain their characteristics after several passages.

The dog can carry an " inapparent " infection, except that there is a rise in temperature and the inoculation into cats of blood taken from these dogs when their temperature is high produces the typical form of gastro-enteritis.

When a diagnosis is made, care must be taken to eliminate enteritis caused by internal parasites and poisoning by minerals or by material containing para-typhoid bacteria, as the symptoms are very similar.

Intramuscular injections of 2 to 3 cg. of " stovarsol " on three consecutive days, combined with administration of a yoghourt preparation, have been found successful in 80 per cent. of cases. A formolized spleen vaccine is of use in prophylaxis.

LUPU, A. (1934). Gastro-enterita contagioasă a pisicilor tratament si vaccinatiune. [**Contagious Gastro-Enteritis in Cats. Treatment and Vaccination**].—*Arhiva vet.* **26.** 139-146. [7 refs.]. [Abst. from French summary].

For the treatment of this virus disease the author administered 2 to 3 cg. " stovarsol " intramuscularly, together with a broth culture of *Lactobacillus*

bulgaricus by the oral route, on three consecutive days. Of 156 cats treated, 90 recovered, 45 succumbed and in 21 cases the results were not determined. Whilst the percentage of cases cured was more than 75 in cats treated on the first and second days, it was only 30 to 40 in those treated on the third and fourth days of illness. Twenty-six cats were inoculated with a formolized spleen vaccine, and all survived the epidemic.

In cats passing through the incubation period the use of simultaneous treatment with the vaccine and " stovarsol " is said to give good results.

BRIDRÉ, J. (1935). Essais de culture *in vitro* du virus de la clavelée. Premiers résultats positifs. [**The Cultivation of Sheep Pox Virus** *in vitro*].—*C. R. Soc. Biol. Paris.* **119.** 502-503.

The author successfully employed the following medium for the cultivation of sheep pox virus :– Drew's liquid, 3 c.c. ; fresh sheep serum, 1 c.c. To this were added cylindrical pieces (4 to 6 mm. × 3 mm.) of living testicular tissue. The medium was sown with 0·5 c.c. of bacteria-free sheep pox lymph and the flasks were stoppered. Sub-cultures were made every three or four days and, after the fourth transplant, inoculation experiments were carried out on sheep. Typical severe reactions were produced. The author concluded that, as any original virus had been exposed to incubator temperature for 14 days and by the fourth subculture was in a dilution of 1 : 10,000 *per se*, it could not have produced such severe reactions, and that definite multiplication in the medium had taken place.
—D. R. WILSON.

BENDINGER, G. G., SHILIN, M. C., & ZAITZEW, W. I. (1935). Forschungen über Ferkelpocken. [**Research on Piglet Pox**].—*Tierärztl. Rdsch.* **41.** 269-278 and 288-291. 6 figs., 2 tables. [22 refs.]

The authors discuss certain skin disorders of young pigs, dividing them into three groups, *viz.* non-infectious exanthema, parasitic exanthema and infectious pox. The latter condition is described in detail as regards clinical findings, histological appearance of the skin and other organs, bacterial examination, aetiology, differential diagnosis and control.

In this condition the skin shows multiple blebs which subsequently ulcerate ; microscopically there is degeneration in the deep layers of the epithelium accompanied by vacuole formation and there is extensive infiltration with lymphocytes. Extra-nuclear cell inclusion bodies are demonstrable which show different staining reactions to Guarnieri bodies. Certain other minor differences between this condition and true variola are noted. The causal agent of the condition has not yet been satisfactorily demonstrated.—E. J. PULLINGER.

GIBBS, C. S. (1933). **The Massachusetts Plan for the Eradication and Control of Infectious Laryngotracheitis.**—*J. Amer. vet. med. Ass.* **83.** 214-217. 1 table. [2 refs.]

The author's experience is that the only successful method of controlling laryngotracheitis consists of the removal of all cases from the premises, the thorough cleansing and disinfection of equipment such as incubators, brooders or houses which may harbour virus, and the exercising of scrupulous care in introducing new stock. These should only be purchased from flocks free from infection or, better still, the poultryman should rely on his own hatchings which have been adequately protected from infection.—GWILYM O. DAVIES.

DOBSON, N. (1935). **Infectious Laryngo-Tracheitis in Fowls.**—*Vet. Rec.* **15.** 774-775.

A general account of the disease, written as the result of the discovery of outbreaks in England.—R. F. GORDON.

DOWNIE, A. W., & MCGAUGHEY, C. A. (1935). **Experiments with the Virus of Infectious Ectromelia. The Action of Immune Serum** *in vivo* **and on the Growth of Virus in Culture.**—*J. Path. Bact.* **40.** 297-310. 4 tables. [23 refs.]

In this paper the authors record cultivation experiments additional to those previously described [this *Bull.* **5.** 630].

It is first of all stated that immune serum from mice is capable of neutralizing the action of virus when mixtures are injected intradermally into mice either immediately after mixing or after a period of hours. Intraperitoneal injection of immune serum also appeared to protect against virus given 24 hours later either by the intradermal or the intraperitoneal route.

In " tissue culture ", however, the growth of virus could only be inhibited and not destroyed by immune serum, even though the quantity of serum was sufficient to neutralize the virus in the *in vivo* tests. When the virus was cultivated in the presence of immune serum, growth was always demonstrable after incubation for eight to 12 days. This was due to the protection afforded by the cells, as immune serum had a marked inhibitory action on virus in the form of a Berkefeld filtrate.—GWILYM O. DAVIES.

LEVINE, P., & FRISCH, A. W. (1935). **Absorption of Bacteriophage by Salmonella.** —*J. infect. Dis.* **57.** 104-117. 9 tables. [39 refs.]

In a previous publication the authors with COHEN [(1934). *J. Immunol.* **26.** 321.] reported that heat-killed bacteria adsorbed specific bacteriophage and that this adsorption is irreversible. It has now been found that specificity of phage is comparable to the various smooth somatic antigens. Organisms having common " O " antigens adsorb the same fractions of phage. This similarity, however, is by no means absolute. Thus, according to phage adsorption tests, the typhoid-*enteritidis* and *aertrycke*-para B groups have a strong common affinity, whereas antigenically this is not the case. Other discrepancies are noted which indicate that some other factor exists which determines the susceptibility of bacteria to lysis, besides the specificity of phage.—E. J. PULLINGER.

INVERTEBRATE VECTORS OF DISEASE.

OLENEV, N. (1934). **The Ticks (Ixodoidea) of North West Russia.**—*C. R. Acad. Sci. U.R.S.S.* **3.** 672-674. [In Russian: French summary]. [Copied *verbatim* from abst. in *Rev. appl. Ent.* **23.** 75].

A list is given of ticks recorded from north-western Russia. In 1933, it was found that besides *Ixodes ricinus*, L., which transmits *Piroplasma* (*Babesiella*) *bovis*, *I. persulcatus*, P.Sch., is also common on cattle. It is probable that it does not transmit bovine piroplasmosis and that it occurs alone in the south-eastern part of the Leningrad Government, where the disease is absent. Both species are found in north-western European Russia, but *I. ricinus* occurs alone in countries to the west of this zone and *I. persulcatus* in the forest belt stretching to the east through Siberia to the Russian Far East.

CARPENTIER, G., & COLAS-BELCOUR, J. (1935). Présence de *Rhipicephalus sanguineus Latr.* sur des chiens de la région parisienne. [**The Presence of** *R. sanguineus* **on Dogs in Paris**].—*Bull. Acad. vét. Fr.* **8.** 405-407. [12 refs.]

In the space of 14 days between the end of June and the beginning of July the authors found four dogs from the suburbs of Paris to be infested with *R. sanguineus*. This tick is very common in the neighbourhood of Toulouse, but has not previously been met with in Paris. The observation is of some veterinary interest as this tick is known to be a vector of canine piroplasmosis.—E. L. TAYLOR.

DUKE, H. L. (1935). **On the Factors that may Determine the Infectivity of a Trypanosome to Tsetse.**—*Trans. R. Soc. trop. Med. Hyg.* **29.** 203-206. [6 refs.]

The author, discussing CORSON's experiments in which 60 per cent. and 33 per cent. of *Glossina morsitans* exhibited salivary gland infection after feeding on an infected reedbuck, points out that an endogenous cycle in the mammalian host may influence the infectivity of a trypanosome to tsetse, and that the low infectivity of CORSON's trypanosome strain, when inhabiting a monkey, may have been due to fly feeding experiments commencing too early, and possibly corresponding with a " negative period " in the trypanosome cycle. He is sceptical of the suggested special suitability of the reedbuck, and thinks that the same phenomenal infectivity will be found to occur in other species of antelope which do not suffer any apparent inconvenience from the trypanosome infection. —U. F. RICHARDSON.

DISEASES CAUSED BY METAZOAN PARASITES.

RÖHRER, H. (1935). Demodicosis bei Ziegen. [**Demodicosis in Goats**].—*Tierärztl. Rdsch.* **41.** 291-293. 1 fig. [15 refs.]

The author states that for 18 months goats in Thuringia had been affected with a skin disease which could not be diagnosed during life owing to the absence of any external lesion, but which rendered the hides useless for manufacture. Tanned hides showed small scars about the size of lentils which, in some cases, completely perforated the skin. These marks were most prevalent on the backs, loins and flanks. The external surface of an untreated skin from an affected goat was absolutely normal but the under surface showed a mass of small nodules. On cutting into the hide it was found that these nodules were situated in the lower layers of the corium and were roundish-oval in shape and about the size of peas, the long axis running antero-posteriorly. They were encased in a tough capsule and the contents were ochre-yellow in colour, and soft and crumbly. Microscopic examination showed the cysts to be filled with *Demodex folliculorum* in various stages of development, i.e. eggs, larvae with two and three pairs of legs and fully developed male and female mites, as well as dead specimens and some epithelial cells.

The lesions were bacteriologically sterile.

Enquiries made by the author revealed that the condition is also present among the goats of Bavaria, Silesia and South Germany.—G. DODS MUNRO.

HORNECK, K. (1935). 36 Jahre Demodex-Bekämpfung beim Hund. [**Thirty-Six Years' Experience with Demodectic Mange in Dogs**].—*Tierärztl. Rdsch.* **41.** 33-38. [23 refs.]

Horneck gives an account of his experiences and views upon follicular mange during the last 36 years. According to him, the four important points are :- (1) the destruction of the inside of the hair follicle by the demodex ; (2) the emigration of the mite ; (3) the invasion of young dogs by the mite from the mother in the

suckling period, or within the kennel during the first few weeks of life, and (4) the influence of medicaments on the healthy and diseased skin.

He comes to a number of conclusions, the most important of which are the following. There are two stages of the disease, one macroscopically uncertain, but microscopically definite and, later, a definitely macroscopic form. The follicular mite is the actual cause of the disease – the pustular form being a complication. The entrance of the parasite is dependent upon a disposition on the part of the dog favourable to the attack of the mite. The mite brings about destruction of the follicles in the course of its stay by invasion or by emigration. Owing to our knowledge of the emigration of the mite, so-called local treatment is inadequate. A general friction of the unclipped dog two or three times gives a prognostic outlook on the degree of extension of the disease. The use and strength of remedies can only be discovered by empirical qualities. Early treatment in the fifth to eighth weeks of life, when diagnosed, wards off the general spread of the parasite and of the disease until the animal acquires greater resistance.—A. W. N. PILLERS.

MACCORMAC, H. (1934). **Cat Scabies.**—*Brit. J. Derm.* **46.** 411-414. [5 refs.]

The paper is introduced by a brief summary of the symptoms of notoedric mange in the cat, and of the lesions which may develop in man as a result of contact with affected animals. It is noted that the parasite is easily demonstrable in the animal, but is very difficult in man. Reference is made to the fact that cats may suffer from symbiotic mange [presumably otodectic mange is intended], which does not spread to human beings. The eruption in man is described as asymmetrical in character, and composed of small acuminate papulo-vesicles. The vesicle rapidly ruptures, leaving a papule surmounted by a small crust. A history of contact with an affected cat is of great assistance in diagnosis. The symptoms in the human patient rapidly disappear after separation from the source of infection.

Details of two outbreaks of cat scabies in man are given. In each three women were affected. The original patient of the first series presented symptoms and gave a history which led to a suspicion of urticaria or a drug eruption. After a month symptoms were still showing, and it was learnt that the patient's two daughters were similarly affected, and that the household cat had an itchy skin eruption. A diagnosis of cat scabies was made, and the patients made a rapid recovery after disposal of the cat. The second group of patients presented no difficulties.—J. W. H. HOLMES.

HOUDEMER, E. (1935). Myiases des animaux domestiques en Indochine. [**Myiases of Domestic Animals in Indo-China**].—*Bull. Soc. Path. exot.* **28.** 298-300.

In Indo-China myiasis is a relatively common disease of animals and man. The author records his experience of the condition in animals in that country under the following three headings :-(1) invasion of the air passages and sinuses of the head seen in the goat and dog ; (2) cutaneous myiasis met with in wounds of cattle and the dog, and (3) myiasis of the plantar region of the foot of the horse and mule.

The greater part of the paper is devoted to the last-named condition which proved a source of trouble in 1931 to 1932. The author ascribes it to faulty stable-management, notably neglect to pick-out feet. The seat of infection was the cleft of the frog, larvae penetrating later to the deep structures of the foot and causing serious damage. Surgical intervention was necessary but all cases responded well to treatment. The injection of antitetanic serum was deemed advisable.

The diptera responsible for the condition were identified as *Chrysomyia* [*Cochliomyia*] *bezzianum* and *Sarcophaga ruficornis*.—C. DAVENPORT.

OLEGÁRIO DA SILVA, J., Jr., & PROENCA, C. (1934). Contribuição ao estudo da Gasterofilose e da Sp. Gasterophilus nasalis (L.1758) no Brasil. **[Contribution to the Study of Gastrophilus Infections and of *G. nasalis* in Brazil].**—*Bol. vet. Exer. Brazil.* **1.** 163-183. [17 refs.]

This is mainly a review of literature, with special reference to the occurrence of the parasites in Brazil. The second larval stage of *G. nasalis* is described.

—R. S. ROBERTS.

KNIPLING, E. F., & TATE, H. D. (1935). **An Outbreak of the Screw Worm, *Cochliomyia americana* Cushing and Patton, in Northwestern Iowa.**—*J. econ. Ent.* **28.** 472-475. 1 fig. [1 ref.] [Copied *verbatim* from *Rev. appl. Ent.* **23.** 200].

In September 1934 numbers of larvae of *Cochliomyia hominivorax*, Coq. (*americana*, Cush. & Patt.) were taken from wounds on domestic animals in Iowa, where this fly has not previously been recorded. Its probable distribution in the north-western part of Iowa and in the part of South Dakota immediately adjacent is discussed. Cattle, principally newborn calves, were the animals most often infested, although horses, sheep, pigs, dogs and fowls were also attacked, approximately in that order of frequency. Myiasis was most often observed between 8th August and mid-October, and examples of *C. hominivorax* were received from one case as late as 21st October. In previous years, although the number of cases of myiasis reported was small, they usually seemed to be more numerous in late spring and early summer.

RITCHIE, J. (1934). **Sheep-Maggot Flies in Scotland.**—*Scot. J. Agric.* **17.** 249-260. 5 figs. on 3 plates.

The greater part of the information in this paper seems to be derived from questionnaires answered by farmers, and from the results of trapping experiments. It appears that sheep maggots have been much more prevalent in Scotland in recent years than formerly.

Calliphora erythrocephala was most numerous in the early and late summer, and *Lucilia sericata* from June onwards. The presence of rabbits and rabbit warrens is commonly believed to contribute to the spread of the flies.

Trapping showed that *L. sericata* disliked shade but took advantage of shelter from wind. It is more probably wind rather than low temperature which keeps the flies off the high hills.

With regard to preventive treatment, the effectiveness of dips is said not to last for more than 14 days and it is essential that the dip should be clean and not above the proper strength as otherwise skin irritation may be set up which predisposes to fly strike.

Early recognition of struck sheep and the proper cleansing of struck areas are considered to be the most important points in the treatment of affected sheep, together with destruction of the maggots removed.

It is concluded that there is a very considerable financial loss to Scottish farming through the sheep maggot fly, and that research for more satisfactory methods of control should be continued.—J. S. STEWARD.

SEEHAWER. (1935). Der heutige Stand der Erforschung und Bekämpfung der Magen- und Darmparasiten des Pferdes. **[Present Knowledge on the Parasites of the Stomach and Intestines of the Horse].**—*Z. Veterinärk.* **47.** 257-273. [40 refs.]

This paper is a brief summary of information on the commonest and most

important parasites of the stomach and intestines of the horse. Notes are given on the life-histories and important points in our present knowledge of the biology of all the commoner helminth parasites, and on the species of *Gastrophilus*. A section on control deals with the resistance of strongyle larvae and ascaris eggs, and on current methods of treatment for all the various parasites. Nothing new is added to what was previously known.—E. L. TAYLOR.

WOOD, W. A. (1935). **Notes on the Commoner Helminth Parasites of the Respiratory and Alimentary Tracts of the Domestic Ruminants.**—*Vet. Rec.* **15.** 1081-1095. [23 refs.]

This paper gives some account of the morphology, and notes on the life-history and biology of the trematode, cestode and nematode parasites of the respiratory and alimentary tracts of ruminants. Recent work on epidemiology, prophylaxis and treatment is also discussed. As the paper covers such a tremendous field of knowledge none of the matter is dealt with in any great detail, but a relatively large amount of space is given to the consideration of the epidemiology of worm diseases.

In discussing the paper TAYLOR suggested that cattle probably suffer more from fascioliasis in Great Britain than is generally admitted. He called attention to the occurrence of atypical outbreaks of disease caused by parasitic worms; acute fascioliasis, chronic parasitic gastritis and acute parasitic bronchitis differ markedly from the usual forms of those diseases. HARVEY, contributing to the discussion, considered that good husbandry was the best insurance against loss from parasitism. MONTGOMERIE, referring to carbon tetrachloride poisoning, said that he had not been able to find any relationship between the mineral content of the feed and a low tolerance in sheep or cattle. ROE said that at MONTGOMERIE'S suggestion he had been using intrarumenal injections over a period of 18 months as a means of administering carbon tetrachloride to sheep and had found it a very successful and rapid method. LAMONT observed that he also had had good results with this method; he observed, in connexion with copper sulphate poisoning, that on one occasion he produced symptoms of poisoning in 18-month-old calves with a dose of 2 drams.—E. L. TAYLOR.

TAYLOR, E. L. (1935). **Some Fallacies in the Diagnosis of Helminthic Disease.** —*Proc. R. Soc. Med.* **28.** 1002-1004.

Three fallacies are dealt with. As helminthic disease depends as a rule upon heavy infestation the concentration of eggs by flotation methods gives a wrong idea of the numbers of worms present, and quantitative methods should be used. Egg counting methods may lead the diagnostician astray as to the extent of infestation, the results varying to a marked degree according to the influence of several factors, including the state of immunity of the host. This should be kept in mind. The third fallacy refers to the diagnosis of helminthiasis at *post-mortem* examination, without making any observations on the number of parasites present. There is no essential connexion between parasitic worms and disease.

TAYLOR, E. L. (1935). **The Association between Gastro-Intestinal Helminths and Disease in Ruminants.**—*Vet. Rec.* **15.** 915-919.

This paper is written in the form of answers to the following three questions :- (1) what species of the gastro-intestinal worms of ruminants are particularly concerned with disease causation ? (2) how do they cause disease ? and (3) what are the factors which decide that they shall do so ? The main part of the paper deals with the answer to the last question. In conclusion it is stated that the under-

standing of the systematic position of the parasite may be regarded as the key to its life-history and habits, and a knowledge of the life-history as the key to control, but that the life-history of the disease as one complete story is also required before the veterinarian has a thorough understanding of its development, knows when to expect its appearance and what steps to take in its prevention.

AFRICA, C. M., & GARCIA, E. Y. (1935). **Heterophyid Trematodes of Man and Dog in the Philippines with Descriptions of Three New Species.**—*Philipp. J. Sci.* **57.** 253-267. 12 figs. on 4 plates, 1 table. [5 refs.]

Monorchotrema taichui, *M. taihokui* and *Diorchitrema pseudocirrata* are reported from man for the first time as natural infestations. A new species, *Heterophyes expectans*, is described from the dog (differing from other members of the genus in that the testes are placed one behind the other, and that the ventral sucker is placed anteriorly). A second new species of this genus, named *H. brevicaeca* is described from the human host (differing from other species in the length of the intestine and position of ovary and seminal vesicles). A new species of *Stictodora*, found in the dog, is also described and named *S. manilensis* ; this differs from the only other species of the genus in that the gonotyl bears hooks instead of triangular plates and also by the presence of a ventral sucker.—E. L. TAYLOR.

SIMMS, B. T., & MUTH, O. H. (1933). **Salmon Poisoning : Transmission and Immunization Studies.**—*Proc. 5th Pacif. Sci. Congr. Victoria & Vancouver.* pp. 2949-2960. 6 tables. [7 refs.]

Following a very concise and informative account of the state of our knowledge of this interesting disease of dogs and cats, the authors give an account of their own series of observations. Transmission of the causal agent was attempted by contact of susceptible and affected dogs, some 500 susceptible dogs being used. In no instance was transmission successfully brought about. Injections of filtrates of infective blood and of ground flukes also failed to produce the disease : injection of blood serum also failed. Washed blood cells proved, however, to be infective on injection and the causal agent was shown to be present in the white cells and not in the red. Drying the blood at 98°F. destroyed the infective agent ; virulent blood heated to 140°F. failed to produce the disease, but the infective agent appeared to be able to withstand 127°F. for a period of two minutes. In two out of four observations, freezing the blood failed to kill the causal agent. Blood stored at 40°F. for two days was found still to be virulent but, if 0·5 per cent. of phenol was added, the causal agent was killed. Mixing hyperimmune blood with infective blood destroyed the causal agent. Blood from an infected salmon failed to produce the disease when injected into a susceptible dog, but 0·5 c.c. of the fluke, *Nanophyetus salmincola*, which is associated with the disease, from the intestines of an immune dog produced typical symptoms when injected subcutaneously into a susceptible dog. About 500 flukes collected from a guinea pig failed to produce the disease when ground and injected subcutaneously into a susceptible dog. In a single instance a susceptible female was mated with a male that had just begun to show symptoms. As a result the female became infected and died.

Immunity was successfully produced by simultaneous injection of immune serum and exposure to the disease. Chloroform-treated tissue vaccines resulted in some protection against subsequent exposure to " salmon poisoning ". Young puppies (13 and 14 days old) from immune dams proved to be susceptible, but five-day-old and 20-day-old puppies from hyperimmune dams proved resistant. One batch of 34-day-old puppies from a hyperimmune dam proved to be susceptible.

It is thought that the causal agent is possibly a rickettsia or one of the haemosporidia. [See also this *Bull.* **1.** 153].—E. L. TAYLOR.

KRULL, W. H. (1935). *Glaphyrostomum mcintoshi*, **n.sp. (Trematoda : Brachylaemidae), with Notes on its Life History.**—*Proc. helminth. Soc. Wash.* **2.** 77. 1 fig.

This species was originally taken from the " oven bird ", but chickens have since been infected experimentally by feeding laboratory raised and infected snails of the species *Zonitoides arboreus*. *G. mcintoshi* differs from *G. sanguinolentum* Werby, 1928, in having a partially spined cuticle and vitellaria extending further forward. The cercariae do not leave the sporocyst in the snail and do not encyst. The snails must therefore be eaten by birds.—E. L. TAYLOR.

WALLACE, F. G. (1935). **A Morphological and Biological Study of the Trematode** *Sellacotyle mustelae* **n.g., n.sp.**—*J. Parasit.* **21.** 143-164. 15 text figs, 8 figs. on 2 plates, 2 tables. [33 refs.]

This new trematode species was originally collected from the mink, where it was found embedded in the mucosa of the small intestine. It is very minute (0·33 mm. long and 0·19 mm. wide), and it has been found to utilize the snail, *Campeloma rufum*, as a primary host and a wide variety of fish as secondary hosts, *Ameiurus melas* apparently being particularly suitable. By means of these intermediate hosts it was found possible to infect the dog, cat, rat, ferret, fox, racoon and skunk as well as the mink. The new trematode belongs to the family Troglotremidae and is closely allied to *Nanophyetus salmincola*, the fluke which is associated with "salmon poisoning" in dogs.—E. L. TAYLOR.

LEE, C. U., & CHU, H. J. (1935). **Simple Technique for Studying Schistosome Worms in Vitro.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1397-1400. 1 fig., 2 tables. [6 refs.]

The special apparatus used consists of one pair of forceps with round and smooth tips, one pair with curved tips and a flask of the shape used in tissue culture, but of a smaller size. Schistosomes are obtained from the large portal veins of an animal, preferably a rabbit, which has been infected eight or ten weeks previously. Rigid aseptic technique must be practised in extracting the worms from the veins ; this is done with the round-pointed forceps in order to avoid injury to the parasites. They are then transferred to a small, covered petri dish containing warm sterile Locke's or physiological saline solution and, later, placed in 2 c.c. of a culture medium in the special flasks. The curved forceps are thought to be an advantage in this transference. The neck of the flask is then plugged with cotton wool and covered with a rubber cap. Almost any blood serum will serve as a satisfactory medium, but human ascitic fluid and sheep's serum appear to be better than horse or rabbit serum. The flukes should be transferred to fresh serum at intervals of one to two weeks. The medium must remain sterile for success and any preparation which begins to look cloudy should be discarded. In one instance schistosomes were kept alive by this method for 82 days.—E. L. TAYLOR.

KRAUSE, K. (1933-1934). Ueber Alveolar-Echinokokkose der Rinderlunge. [**Alveolar Echinococcosis of the Lungs of Cattle**]. *10 Annu. Univ. Sofia, Vet. Fak. 1933-1934.* pp. 195-217. 9 figs. on 4 plates. [18 refs.] [In German : Bulgarian summary].

A general account is given of the incidence, pathology and symptomatology of infection with *Echinococcus alveolaris* in Bulgaria. This form of hydatid cyst

is not so rare in Bulgaria as it appears to be elsewhere, an examination of a large number of bovines in Sofia showing that it occurs in 3 per cent. of the lungs and in 3·5 per cent. of the livers of cattle, but it was not observed at all in the livers of buffaloes and only once in the lung of one of these animals. Apparently the buffalo is a less suitable host for this form of the parasite and the observation suggests that *E. alveolaris* is a distinct strain ; feeding experiments to dogs and the reinfection of cattle is the only way in which this point is likely to be settled and experimental information of that kind is still lacking.

The cysts are described in detail and an account given of the reactions of the host. Symptoms are rarely manifested by animals carrying these cysts in the lungs, although a husky cough may sometimes be caused not infrequently leading to a wrong diagnosis of tuberculosis. In the liver the parasite more frequently gives rise to symptoms of the nature of a general debility, resulting from interference with digestive processes. [This peculiar cyst, which by many authorities is regarded as representing a separate species, occurs in masses which have the appearance of well-defined tumours, showing numerous alveoli on section, containing small cysts about the size of a millet seed. The cysts are held together by a strong connective tissue stroma].—E. L. TAYLOR.

WIRTH, D. (1935). Der Besitzer eines Hundes soll an Echinokokkenblasenkrankheit leiden ; der Arzt wünscht die Untersuchung des Hundes auf Echinokokkenbandwürmer. Wie soll der Tierarzt hiebei vorgehen ? [**Examination of Dogs for Echinococcus Infestation**].—*Wien. tierärztl. Mschr.* **22.** 366.

When hydatid disease is diagnosed in the owner of a dog and the medical attendant requires an examination of the dog by the veterinary surgeon for infection with echinococcus it should be remembered that the dog is not the only source of infection, man not infrequently becoming infected through eating contaminated uncooked vegetables. [This important point appears to be very generally overlooked in considering the spread of human infection with this dangerous parasite]. Wirth has seen several cases in which he considers that infection must have been acquired in this way. He gives a brief account of his technique for diagnosis of infestation in dogs : this consists of the administration of arecoline and a search through the faeces which are subsequently expelled as a result of the dose.
—E. L. TAYLOR.

SKINNER, Mary S. (1935). **A Redescription of** *Taenia tenuicollis* **Rudolphi, 1819, and its Larva,** *Cysticercus talpae* **Rudolphi, 1819.**—*Parasitology.* **27.** 175-185. 22 figs. [11 refs.]

This paper gives a detailed description of specimens of *T. tenuicollis* collected from *Mustela vison* (the mink) and of *C. talpae* (which appears to be the intermediate stage of that cestode), collected from the liver of the musk rat. There is also considerable discussion on the synonymy.—E. L. TAYLOR.

DIXON, H. B. F., & SMITHERS, D. W. (1935). **Cysticercosis** (*Taenia solium*). – *J. R. Army med. Cps.* **64.** 227-234 and 375-380, and **65.** 28-34 and 91-98. 10 figs. [Numerous refs.]

This paper gives an account of an investigation into cysticercosis, principally in man. During the course of the work some 258 cases were studied, 214 of which had attended the Queen Alexandra Military Hospital, Millbank. The authors were unable to trace any published account of a case in England since 1892 that was not a sailor, soldier or a soldier's wife or child [who would presumably have

been overseas], confirming the meat inspection evidence of the scarcity of porcine infection in Great Britain. The value of X-rays for the diagnosis of cysticercosis is clearly brought out, calcified cysts being easily demonstrable by this method (calcification may not develop, however, in *Cysticercus cellulosae* infection for four or five years). The removal and examination of subcutaneous nodules which might contain cysticerci is also a valuable diagnostic procedure, but serological methods are of little value and it is often impossible to make a final diagnosis until examination has been repeated over a period of years.—E. L. TAYLOR.

LAPAGE, G. (1935). **The Second Ecdysis of Infective Nematode Larvae.**—*Parasitology*. **27.** 186-206. 6 figs. [11 refs.]

The infective larvae of *Haemonchus contortus*, *Ostertagia circumcincta* and *Trichostrongylus* spp. were grown on pure cultures of bacteria for use in these observations. They were placed in various dilutions of " milton " hypochlorite solution and a study made of the ecdysis. It was found that this could be induced by dilutions up to 1 : 20, but that neither chlorine, oxygen, nor caustic soda alone could cause the ecdysis, nor could carbonic acid, hydrochloric acid nor sodium chloride. " Milton " is thought to owe its action to an alteration in the chemical composition of the sheath, bringing about an alteration in its permeability and an increase in internal pressure that finally results in the expulsion of the larvae through a hole in the anterior end of the sheath. The larva then frees itself from the sheath by its own efforts. On account of the toughness of the sheath, it is thought that ecdysis can rarely be caused by mechanical damage alone.—E. L. T.

HOBMAIER, M., & HOBMAIER, A. (1935). **Mammalian Phase of the Lungworm Aelurostrongylus abstrusus in the Cat.**—*J. Amer. vet. med. Ass.* **87.** 191-198. 15 figs. on 1 plate. [6 refs.]

Contrary to CAMERON's observations, these authors have found that mice cannot be infected with the first-stage larvae of *A. abstrusus*, but that various slugs and snails are required for the development of the early stages. The following species have been found to serve in this way :– *Helminthoglypta californensis*, *H. nickleana*, *H. arrosa*, *Helix aspersa*, *Agriolimax agrestis* and *A. columbianus*. It has also been observed by these authors that various cold-blooded animals (frogs, toads, lizards and snakes), birds (sparrows, chickens and ducklings) and small mammals (rodents and others) can act as auxiliary hosts. The migrations and development of the worm in the final host were traced in detail, and it was found that infective larvae develop after two ecdyses in slugs and snails. They may then be taken up by any of the auxiliary hosts already mentioned. The worm develops to maturity only in the lungs of cats in which the third-stage larva undergoes two further moults, first-stage larvae appearing in the faeces five weeks later. Worms were never found in the vessels between the heart and lungs (as described by CAMERON), but only embedded in the tissues of the lungs.—E. L. TAYLOR.

PAVLOV, P. (1935). Recherches sur le cycle évolutif de *Metastrongylus elongatus* et de *Dictyocaulus filaria*. [**The Life-Cycle of** *M. elongatus* **and** *D. filaria*]. —*Ann. Parasit. hum. comp.* **13.** 430-434. 9 figs. [6 refs.]

This paper gives a brief account of work confirming the observations of HOBMAIER and HOBMAIER on the intervention of *Lumbricus terrestris minor* in the life-cycle of *M. elongatus* and the direct development of *D. filaria*, without the intervention of an intermediate host. Nothing new is added to previous knowledge.—E. L. TAYLOR.

CLAPHAM, Phyllis A. (1935). **On Nodules occasioned by Gapeworm in Pheasants.** —*J. Helminth.* **13.** 9-12. 1 fig. [1 ref.]

The author describes the histological changes in nodules caused by *Syngamus trachea* on the mucous surface of the trachea of a pheasant. The head and anterior end of the male worm was found to be completely buried in an outgrowth of white fibrous tissue. In older nodules the circulation is completely cut off by a thick fibrous layer and necrosis sets in. Degenerative changes were apparent in the tracheal cartilage adjacent to the nodules.—E. L. TAYLOR.

CLAPHAM, Phyllis A. (1935). **On the Experimental Transmission of** *Syngamus trachea* **from Starlings to Chickens.**—*J. Helminth.* **13.** 1-2. [2 refs.]

TAYLOR found some difficulty in transmitting the gapeworm directly from starlings to chickens, but Clapham has found that this can easily be brought about if the larvae are first taken up by earth-worms. This observation suggests that starlings are of importance in the spread of syngamiasis to chickens. It is recorded that the starling strain of gapeworms was recovered from the top of the trachea in the experimental chickens confirming TAYLOR's observation on that point. —E. L. TAYLOR.

CLAPHAM, Phyllis A. (1935). **The Treatment of Gapeworm Disease.**—*J. Helminth.* **13.** 3-8. 1 table. [1 ref.]

As the active principle of garlic oil is excreted by the lungs, some tests were planned and carried out to ascertain whether the administration of this drug might have some effect upon *Syngamus trachea* in chickens. The maximum daily dose that could be tolerated by a chicken was found to be 2 minims, and in the main part of the observations one-third of this amount was given three times during the day, being placed " well back in the throat " by means of a fine pipette. The drug was found to have a marked effect upon the parasites and to bring about not only their death but also their dissolution, the exterior of the worms rupturing and internal organs escaping and being coughed up by the host. Similar trials were carried out with carbon tetrachloride but only poor results were obtained. On account of the difficulty in infecting chickens uniformly, no controls were kept in these observations.—E. L. TAYLOR.

TAYLOR, E. L. (1935). *Syngamus trachea.* **The Longevity of the Infective Larvae in the Earthworm. Slugs and Snails as Intermediate Hosts.**—*J. comp. Path.* **48.** 149-156. 1 fig., 1 table. [5 refs.]

Earth-worms collected at intervals from a plot of ground that had been heavily infected with *S. trachea* were fed under experimental conditions to small groups of chicks, and it was found that the gapeworm larvae retained their infectivity in the earth-worms for upwards of three and a half years. 330 earth-worms from another part of the field containing the experimental plot and from under a large tree near to the experimental plot were fed to chicks as a control, to check the possibility of fresh infection having been brought in by wild birds, but these trials gave negative results. One apparently viable larva enclosed in a thick-walled cyst was recovered by digestion from an earth-worm.

Trials were made of other possible intermediate hosts, and it was found that slugs and snails could act as collecting and storing agents in the same way as earth-worms. *Agriolimax agrestis*, *Helix aspersa*, *Cèpea hortensis* and *Helicella heripensis* gave positive results ; the larvae were found in various parts of the snails, but appeared to show a preference for the nerve ganglia in *A. agrestis*, 15 of a total of 23 larvae in one specimen having been found in the nerve ganglia of

the head. Feeding experiments with caterpillars, leather jackets, wire-worms, millepedes, wood-lice and coprophagus beetles gave negative results.

The structure of the bursa of the male *S. trachea*, the habitat of the species in the respiratory tract and its faculty for utilizing a variety of intermediate hosts suggest affinities of the genus *Syngamus* with the Metastrongylidae.

TAYLOR, E. L. (1935). **The Treatment of Gapes in Chickens by Mechanical Removal of the Parasitic Worms.**—*Vet. Rec.* **15.** 692-693. [2 figs.]

Successful use has been made of a corkscrew-like instrument for the extraction of *Syngamus trachea* from the tracheae of infested chickens. The instrument is made of brass wire (such as is used for twisting into rabbit snares) wound in the form of a corkscrew, one-twelfth of an inch in external diameter. Details are given as to the interspaces between the successive turns of the wire, the length of the spiral and other particulars upon which the efficiency of the instrument depends, as also concerning the best way of holding the chicken for the operation. In extracting worms the instrument is passed down the trachea, maintaining a rapid screwing movement while doing so, to the region of the bifurcation ; it is then withdrawn, still maintaining the twisting movement in the same clockwise manner. The whole operation takes no more than 20 to 30 seconds ; in one instance 45 pairs of worms were removed within 25 seconds. Over 70 chickens have been successfully treated.

ACKERT, J. E., & EISENBRANDT, L. L. (1935). **Comparative Resistance of Bronze Turkeys and White Leghorn Chickens to the Intestinal Nematode,** *Ascaridia lineata* **(Schneider).**—*J. Parasit.* **21.** 200-204. 1 table. [7 refs.]

In two separate experiments, the resistance of a total of 19 turkeys, 29 chickens and 4 ducklings of the same age (either six weeks or one month old) was measured by determining the lengths and numbers of *A. lineata* removed from the birds either one month or three weeks after they had been given approximately the same number of embryonated eggs of *Ascaridia per os*.

The ducklings developed no infection. The turkeys always harboured fewer *Ascaridia* than the chickens. The authors found no evidence in favour of SANDGROUND's view that chickens are abnormal hosts of *A. lineata* and therefore are more resistant to it, nor of the inference that turkeys are the natural and therefore the less resistant host of this species. The authors consider that White Leghorn chickens about two months old appear to be more important factors in the spread of *A. lineata* than turkeys of the same age.—G. LAPAGE.

ACKERT, J. E., PORTER, D. A., & BEACH, T. D. (1935). **Age Resistance of Chickens to the Nematode,** *Ascaridia lineata* **(Schneider).**—*J. Parasit.* **21.** 205-213. 2 figs., 1 table. [27 refs.]

Age resistance to nematodes in general is briefly discussed. 382 chickens in nine different age groups were fed either 50 or 300 eggs of *A. lineata* per individual and killed three weeks later. Their resistance to the nematodes was measured by the average length per group of chickens of the worms removed.

As the groups became older the worms removed showed what the authors regard, after allowing for errors, as a significant shortening, indicating increased resistance to the nematodes, till the chicks were 71 days old, after which age the rate of increase of resistance slackened. The shortening of the worms was more marked when 300 eggs were fed to each chick.

The results do not support SANDGROUND's view that the chicken is an abnormal host of *A. lineata* [see previous abstract]. The authors suggest that, as the chicken

grows older, it develops more potent growth-inhibiting factors (which they compare with such a factor described by CARREL and EBELING in the serum of chickens) which may inhibit the nematode's development, although the nature of such factors is unknown. The authors explain why they do not think that the intestinal mucosae of young chickens could promote nematode growth more than those of older chickens.—G. LAPAGE.

MCRAE, Anne. (1935). **A Study of the Moisture Requirements of the Eggs of the Chicken Ascarid** *Ascaridia galli*.—*J. Parasit.* **21.** 220.

According to other authors, the eggs of the horse ascaris and the dog ascaris will develop in relative humidities as low as 40 per cent., 50 per cent. and 77 per cent., but the eggs of *A. galli* appear to require more moisture for their development. At 77 to 82 per cent. relative humidity they remained viable for two to four weeks, but did not develop beyond the morula stage, and a relative humidity of 82 to 86 per cent. was found to be necessary for the complete development of the embryo.—E. L. TAYLOR.

MCRAE, Anne. (1935). **The Extra-Corporeal Hatching of Ascaris Eggs.**—*J. Parasit.* **21.** 222-223.

From time to time many unsuccessful attempts have been made to induce the eggs of *Ascaris lumbricoides* to hatch outside the animal body. Using embryonated eggs which had been kept for two years at room temperature, the author tried to induce hatching by alternately cooling and warming between the temperatures of 0° and 40°C. Hatching was not brought about by this method but a chance observation led to the discovery that stirring the embryonated eggs in moist sand induced hatching very quickly, and in a short time most of the larvae were found to have left the eggs. They did not live for long in the free state, however, and on the second day all appeared to be dead. Shaking the embryonated eggs with glass beads or shot was found to produce the same effect as was obtained by stirring with sand.—E. L. TAYLOR.

MATOFF, K. (1935). Versuche zur Feststellung der Mindestzahl von Muskeltrichinellen, welche zur Invadierung von Maüsen, Ratten, Meerschweinchen, Kaninchen und Hunden erforderlich ist. [**The Minimal Number of** *Trichinella* **Larvae Required for Invasion of Mice, Rats, Guinea Pigs, Rabbits and Dogs**].—*Tierärztl. Rdsch.* **41.** 466-471. 2 tables. [17 refs.]

Several mice, rats and guinea pigs, three rabbits and two puppies received varying doses of small numbers of trichinae which were collected from infected muscle in the required numbers by means of crush preparation. On subsequent examination of the infected animals, it was found that two trichinae only were sufficient to bring about invasion of the musculature of rats and mice. Evidence was obtained which suggests that previous fasting enhances the susceptibility and it was observed, in the animals which received this minimum infective dose, that the diaphragm became more heavily infected than did the masseters. The experiments on the guinea pigs showed that ten larvae were not sufficient to produce infection in these animals and a dose of 50 trichinae failed to infect in one out of two rabbits to receive that dose. Dogs are generally thought to be relatively resistant but one dose of ten and one of 20 trichinae given respectively to each of two four-week-old puppies resulted in a light infestation. The successful results from feeding only two trichinae to rats and mice suggest that the proportion of male to female larvae in trichinosed muscle is 1 : 1.—E. L. TAYLOR.

KOLBE, F. (1935). Neueres über die Trichine II. **[Recent Observations on Trichinosis].**—*Z. Fleisch- u. Milchhyg.* **45.** 405-408 and 427-430. [2 refs.]

This paper is a useful summary of the work which has been published on trichinosis since the author's previous account which appeared under the same title in 1931. The matter is grouped into sections dealing with the biology, resistance of trichinae to various external conditions, trichinosis, meat inspection for trichinae, diagnosis and therapy; the reference to each publication is given and followed by a very brief account of the findings of the various workers.
—E. L. TAYLOR.

TRAWINSKI, A. (1935). Studien über Immunität bei Trichinose. **[Studies on Immunity to Trichinosis].**—*Zlb. Bakt. I. (Orig.).* **134.** 145-149. [20 refs.]

Observations were first carried out, for the purpose of these trials, to ascertain the lethal dose of trichinae for the rat and it was found that 200 larvae were usually sufficient to kill a rat, 90 per cent. of rats experimentally infected with that number of larvae dying between the 10th and 15th days. Serum collected from rabbits which had received several injections of washed and pulverized trichinae was found to have little or no protective action, but serum collected from rabbits which were heavily infected with trichinae was found to have a marked protective action, and three injections during the time of the wandering of the larvae were found to be sufficient to protect a rat against three times the usual lethal dose of trichinae (600 to 700 trichinae). Many larvae were found, however, in the muscles of the immunized rats; it was also observed that the protecting effect of the first inoculation was of short duration only and it is considered probable that the action of the protective serum is antitoxic rather than antiparasitic.—E. L. TAYLOR.

HU, C. H., & HOEPPLI, R. J. C. (1935). **Route of Migration of** *Spirocerca sanguinolenta* **in Experimentally Infected Dogs.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1393-1394. [2 refs.]

FAUST concluded that the larvae of *S. sanguinolenta* in the dog arrive at their final site, in the upper thoracic aorta, by penetrating the wall of the stomach, passing into the portal veins, through hepatic capillaries and pulmonary capillaries, attaching themselves to the intima of the lower thoracic and upper abdominal aorta and migrating anteriorly to their final site. Hu and Hoeppli were not convinced that the larvae could pass through two sets of capillaries and therefore repeated the experiment on 12 young dogs, each fed with 270 to 400 infective larvae, and killed for autopsy at times varying from two hours to six weeks after the infective feed. They concluded that the larvae penetrate the stomach wall, but then, on reaching the serosa, invade the walls of the gastric and colic arteries, then the lower thoracic aorta and thence along to the upper thoracic aorta. Their presence in the arterial walls results in marked necrosis, acute inflammation and linear abscesses which, however, heal rapidly. It was also observed that larvae injected into one lung and one liver did not leave *via* the blood, but could subsequently be recovered by digestion of the tissues of these organs; this confirms the authors' view that the larvae do not pass through the capillaries.—E. L. TAYLOR.

KREIS, H. A., & FAUST, E. C. (1933). **Two New Species of Rhabditis (*Rhabditis macrocerca* and *R. clavopapillata*) Associated with Dogs and Monkeys in Experimental Strongyloides Studies.**—*Trans. Amer. micr. Soc.* **52.** 162-172. 2 plates. [5 refs.]

Contamination of strongyloides cultures with rapidly multiplying growths of *Rhabditis* was at first thought to be resulting from dirty petri dishes, then dirty

cages were suspected and, finally, it was found that the *Rhabditis* were developing in abundance among the perianal hairs and to a lesser extent on the hairs of the abdomen, legs and head of the experimental animals. Two new species of *Rhabditis* were found to be concerned ; these are named and described in detail and it is concluded that they are not parasitic but pure saprozoic.—E. L. TAYLOR.

IMMUNITY.

GLOVER, R. E. (1935). Production de la tuberculine en milieu synthétique. [**Production of Tuberculin in Synthetic Media**].—*Bull. Off. internat. Epiz.* **10.** 273-302. Discussion pp. 415-422. 2 tables. [48 refs.]

This article comprises a general review of the preparation of tuberculin in synthetic media and the application of such products to the diagnosis of tuberculosis in cattle. The subject is discussed under the following headings :– the value of tuberculin in diagnosis, the significance of non-specific reactions, the composition of synthetic media, the nature of the specific tuberculin substance, the effect of heat and other agents on tuberculin with special reference to reduction in potency and sensitization by unheated tuberculin, the value of synthetic medium tuberculin in testing cattle and standardization. The paper contains details of personal observations which have already been abstracted [see this *Bull.* **4.** 476].

BOQUET, in discussing this report, expressed the opinion that the selection of a suitable strain of *Mycobact. tuberculosis* was of primary importance, but admitted that the amount of growth, which in turn was dependent upon the composition of the medium, influenced the yield of tuberculin. With regard to sensitization with tuberculin protein, he considered that the reactions were of the anaphylactic and not of the allergic type. He thought it unlikely that cattle could be sensitized by amounts of tuberculin such as those habitually used in the intradermal test.

LOURENS quoted a series of comparative tests in cattle (subcaudal fold) which had convinced him that a synthetic medium tuberculin, while inducing a much smaller reaction in negative cattle than " old tuberculin " at the 24th hour, was equal to it at the 48th hour. He stressed the importance of filtering tuberculin, since unfiltered tuberculin might contain a few dead tubercle bacilli capable of sensitizing animals to subsequent tests.

SEIBERT, Florence B. (1935). **The Chemical Composition of the Active Principle of Tuberculin. XIX. Differences in the Antigenic Properties of Various Tuberculin Fractions ; Adsorption to Aluminium Hydroxide and Charcoal.** —*J. Immunol.* **28.** 425-432. 2 tables. [26 refs.]

Two substances can be obtained from the protein fractions of tuberculin, one with a molecular size of about 25 thousand, and one much smaller in size ranging from four thousand to two thousand. The former is prepared from unheated tuberculin (synthetic medium) by repeated ammonium sulphate precipitations. It is an excellent antigen for eliciting precipitins or the Arthus phenomenon in sensitized guinea pigs. The latter is isolated from heated "old tuberculin" by means of trichloroacetic acid and is not able to provoke the formation of antibodies. If, however, it is adsorbed on to aluminium hydroxide or charcoal, it becomes antigenic and can stimulate the production of antibodies.—R. E. GLOVER.

CUILLÉ, J., & CHELLE, P. (1935). L'intra-dermo-tuberculination seconde. [**The Double Intradermal Tuberculin Test**].—*Rev. gén. Méd. vét.* **44.** 321-344. 6 tables. [13 refs.]

Since 1926 the authors have undertaken a series of experiments on the double intradermal test embracing more than eight hundred cattle. Recently they have employed a synthetic medium tuberculin which has been without appreciable action on the skin of normal animals, but has given reactions as marked as those induced by a 25 per cent. dilution of "old tuberculin" in tuberculous cattle. They have noted that in the vast majority of cases the differentiation of positive from frankly negative reactions has been clear-cut, but occasionally doubtful responses have arisen. The amount of the mean increase in the skin measurements is regarded as the most satisfactory method of classification.

The influence of repeated intradermal injections on subsequent inoculations was studied in 17 reacting cattle, and the opinion was formed that no tolerance developed. With regard to the effect of one or more subcutaneous injections of tuberculin on a subsequent double intradermal test, it was found that a single or double dose did not prevent the development of a reaction to a subsequent intradermal test, but repeated inoculations at short intervals tended to produce a cutaneous desensitization which was well marked after the fourth injection: on the other hand, the majority of cattle reacted to a subcutaneous test carried out after a double intradermal test.

It is suggested that the discrepancies between the two tests were due not to an inhibitory effect exercised by the intradermal over the subcutaneous method, but to differences in the sensitivity of the two tests which indicated that the intradermal method was the more reliable. This contention was borne out by the results of *post-mortem* examinations of animals tested simultaneously by both methods. In 387 animals, there were discrepancies between the two tests in 35 cases. One animal, negative to the double intradermal test but positive to the subcutaneous test (double dose), showed tuberculous lesions. In the remaining 34 cases, the intradermal reaction was positive and the subcutaneous negative; 24 of these animals were killed and were affected with tuberculosis, of which 18 were advanced cases. The article concludes with a discussion on no-lesion reactors.

—R. E. Glover.

Gernez, C., & Marchandise, C. (1935). La specificité des réactions cutanées tuberculiniques. Étude critique et expérimentale. [**The Specificity of Cutaneous Tuberculin Reactions**].—*Rev. Immunol.* **1.** 315-335. 5 figs. [42 refs.]

A series of experiments in man have convinced the authors that the intradermal test with serial doses of tuberculin yields the most precise evidence of cutaneous allergy: nevertheless, many circumstances may falsify the reactions. For instance, by certain experimental artifices it is possible to provoke typical reactions in persons entirely free from tuberculous foci. These conditions are discussed in detail. In addition, factors which may modify a specific cutaneous response are analysed.—R. E. Glover.

Volik, E. K., & Basileff, P. M. (1935). **Allergic Tests for Brucella Infection in Farm Animals.**—*Sovyet. Vet.* No. 1. pp. 37-42. 6 tables. [Abst. from French summary].

This paper records the results of an investigation of the methods of diagnosis of brucella infection in farm animals. In all, 4,700 animals were tested. The experiments showed that Dubois' abortin, prepared according to a modification proposed by the Institute of Veterinary Research, Moscow, was superior to all other biological agents. This reagent enabled a definite diagnosis to be made in 23 per cent. of the cases which proved negative or doubtful to the agglutination

test. It was also found to give a higher proportion of positive reactions in adult animals and more negative reactions in young animals.

Abortin prepared according to Koch's technique for tuberculin proved weak in action and yielded a higher proportion of doubtful results than Dubois' abortin.

Agglutinins were found to persist in the blood of inoculated animals one or two months after testing with abortin.—C. DAVENPORT.

PAGNINI, U., & ANGLESIO, C. (1935). L'oftalmo-reazione di Van der Hoeden nella diagnosi dell'aborto infettivo dei bovini. [**van der Hoeden's Ophthalmic Test for** *Brucella abortus* **Infection in Cattle**].—*Nuovo Ercol.* **40.** 15-31. 3 tables. [63 refs.]

The authors discuss the various tests used for the diagnosis of infectious abortion in cattle and point out that none is entirely satisfactory. It has recently been suggested that tests which depend upon allergic responses should be used and an opportunity arose to try out van der Hoeden's ophthalmic test on three farms which were known to be infected with *Br. abortus*. The antigen was prepared as follows :– the bacilli were washed off 48-hour agar slopes with 1 to 1·5 c.c. of distilled water, the suspension was then heated in a water bath at 56°C. for 30 minutes and an equal quantity of glycerin added. Four to five drops of this solution were instilled into the left eyes of the animals to be tested, the right eyes, into which four to five drops of glycerin and normal saline were instilled, serving as controls. The formation of pus accompanied by reddening and swelling of the conjunctiva indicated a positive reaction. This was usually fully developed by the 12th to the 16th hour, but occasionally not until the 36th hour. The results of this test were compared with those obtained by the agglutination and complement-fixation tests. The ophthalmic test proved itself to be specific, but doubtful results were not uncommon and it was clearly inferior to the agglutination test. It is, however, easy to carry out and may be of service in reaching a rapid conclusion as to the approximate extent to which a herd of cattle is infected by *Br. abortus*.—J. A. NICHOLSON.

CLAWSON, B. J., & BAKER, A. B. (1935). **Relation of Allergy to the Antibody Content in Animals Vaccinated with BCG.**—*J. infect. Dis.* **56.** 297-300. 3 tables. [5 refs.]

Rabbits were vaccinated with either living or heat-killed BCG or were desensitized after vaccination. Three weeks after vaccination, and three weeks after desensitization in the case of the desensitized group, the animals were tested by the intracutaneous tuberculin test. Simultaneously the blood serum was examined for agglutinins and complement-fixation antibodies. No evidence of correlation between the skin reaction and the agglutination and complement-fixation titres was found.—P. L. SHANKS.

NÚNEZ, J. O., & LÓPEZ, M. C. (1934). Investigaciones sobre la intradermoreacción aplicada al diagnóstico de la equinococcosis. [**Intradermal Reaction in the Diagnosis of Echinococcosis**].—*An. Med. interna.* **3.** 609-615. 3 tables. [25 refs.] [Copied *verbatim* from *Helminth. Abstr.* **3.** 88. Signed P. A. C.]

Núñez and López give experimental evidence to show that the Casoni reaction, with Hydatid extract, is not specific as it is a group reaction giving a positive result when any Taenia is present. Antigenic substances exist common to taenias of very different species. They describe a method of extracting an antigen from a fresh intestinal taenia which, they claim, gave results much more marked and

specific than those obtained by the Casoni reaction. In an addition at the end of the paper, they call attention to results recently published by Morenas. He used an antigen made from cysts of *T. serrata* and produced results which bear out those of the present authors.

—. (1934). **The Influence of Nutrition upon Resistance to Infection.**—*Med. J. Aust.* Nov. 17th. 652-653. [1 ref.]

A general discussion based upon a review by CLAUSEN [this *Bull.* **5.** 33]. There are indications that outstanding deficiencies may lower resistance to infection, but that increased feeding of various vitamins to the normal animal may not increase resistance. In many experiments the effects of changes in body temperature, inanition and lessened food intake have not been controlled. Few experiments have been made on animals receiving a diet only partially defective, yet partial deficiency is far more likely to occur than total deficiency. Multiple partial deficiencies have been neglected.

It would appear that susceptibility to infection is not affected by diet, though resistance to infection may be greatly reduced by deficient diet.—H. McL. GORDON.

SERGENT, Ed., PARROT, L., & DONATIEN, A. (1934). Ueber den Begriff der " Prémunition ". [" **Premunition** "].—*Med. Welt.* **8.** 1455. [3 refs.]

The authors emphasize the fact that the term " premunition ", introduced by them in 1924, is not synonymous with the term " acquired immunity " which is post-infection immunity, but means " infection immunity ", a relative state of protection against or tolerance to a super-infection and produced by a latent infection, e.g. in malaria, trypanosomiasis, tuberculosis, syphilis, bartonella infection and certain worm diseases. This infection immunity is far more closely dependent upon the state of the reticulo-endothelial system than upon antibody production, the spleen being the organ of chief import. It may be followed in certain cases by true or acquired immunity. This state of infection immunity can be artificially produced, e.g. by BCG and protective inoculation against piroplasmosis or brucella infection. Ideally such a state of protection should be produced without clinical disturbance.—A. W. STABLEFORTH.

TEALE, F. H. (1935). **Some Observations on the Relative Importance of the Reticulo-Endothelial Tissues and the Circulating Antibody in Immunity. II. Hypersensitiveness and Immunity to Foreign Proteins. An Analysis of the Parts Played by the Tissues and Circulating Antibody in these Two States.**—*J. Immunol.* **28.** 161-182. [4 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 640].

The relationship between circulating antibody and fixed tissue antibody to injections of corresponding antigen has a direct bearing upon the subject of anaphylactic shock and upon the underlying and essential subject of immunity. It is recognized that anaphylactic shock results from the reaction *in vivo* between fixed antibody and antigen. The author found that, even if there were sufficient antibody circulating in the blood to saturate any dose of antigen inoculated before it reached the tissues, shock would nevertheless follow the inoculation since the circulating antibody was unable to assist or protect the tissues. Furthermore the inoculation of antigen, previously saturated (*in vitro*) with antibody, provoked shock in a partly immunized animal. A fully immune animal (i.e. one containing an optimum of fixed tissue antibody) could resist the inoculation of antigen either saturated or unsaturated with circulating antibody.

These findings indicate that hypersensitiveness is entirely dependent upon

the reaction between antigen and fixed tissue antibody situated in the reticulo-endothelial system and is entirely unrelated to the circulating antibody. No essential difference is thought to exist between the two types of antibody beyond the fact that the one circulates in the globulin fraction of the blood serum, whilst the other is attached to the animal tissues.—E. J. PULLINGER.

LEWIS, J. H. (1935). **A Theory of Hapten Action.**—*J. infect. Dis.* **57.** 94-103. [20 refs.]

The term haptene is applied to that group of non-protein substances which, when linked with protein, can stimulate the production of antibodies specific to themselves. Furthermore *in vitro* such substances without the protein linkage can react with their specific antibodies. The haptenes comprise three main groups of substances, viz. simple organic compounds such as tartrates, lipoids and carbohydrates.

The fact that the haptene by itself is not antigenic and only acquires this property when linked to a protein would suggest that the protein is the essential antigenic factor whilst the haptene is of secondary importance only; however, such an idea becomes untenable when it is remembered that specificity is associated with the haptene and not with the protein, thus two different proteins if linked to the same haptene are immunologically similar. The linkage between haptene and protein is essentially a chemical one and not a mere adsorption of one on to the other because, due to the linkage, the haptene is rendered antigenic, whereas haptene plus gelatine (a non-antigenic protein) produces a non-antigenic complex.

The writer suggests that the fact that haptene alone can react with antibody *in vitro* may be explained as follows. Haptene mixed with a solution of protein combines to some extent with the protein to form the haptene-protein complex. Therefore, when haptene and antiserum are mixed in an *in vitro* test the haptene combines with serum protein to form the complex and this complex reacts with the antibody of the serum. If this is the case, the idea that haptene can combine with antibody would be an illusion arising from the very nature of the test which includes serum. This hypothesis is discussed.—E. J. PULLINGER.

—. (1935). **Report of Committee [Brit. Med. Ass.] on Immunization including Vaccination.**—*Brit. med. J.* June 22nd. 282-293 of Suppl. 1 table.

This committee, which was asked to consider " the desirability of preparing a practical scheme for informing the public generally regarding the protection afforded by various methods now available of immunization against diseases ", has presented a report on those diseases which lend themselves to control by different methods of immunization, viz. diphtheria, scarlet fever, measles, typhoid fever and small pox.

From the veterinary point of view, the most interesting conclusions are those concerned with the protection of communities. It is pointed out that compulsory immunization against each disease, as reliable methods become available, would meet with strong opposition. It is essential, therefore, that public opinion should be informed as to what can be achieved by immunization, and this task is essentially one for local authorities. These bodies, under the co-ordination of the Ministry of Health, should undertake the advertising and carrying out of immunization, making it compulsory if necessary.—R. E. GLOVER.

SILBERSCHMIDT, W. (1934). Immunisierung durch Inhalation. **[Immunization by Inhalation].**—*Schweiz. med. Wschr.* **15.** 1089-1090. [1 ref.]

Silberschmidt has already reported that immunity can be produced by the

inhalation of diphtheria or tetanus anatoxin, that it lasts at least two months and protects against 20 lethal doses. The immunity begins from eight to 20 days after the beginning of inhalation and is dependent upon the amount of antigen inhaled. Passive immunity can also be conferred in the same manner.

Further work has shown that guinea pigs which have inhaled ox serum exhibit typical anaphylactic shock following intravenous injection of serum. Desensitization was not produced by repeated inhalations. The inhalation of diphtheria or tetanus toxin or of ricin produced severe symptoms, even in small doses. The subcutaneous injection of tetanus or diphtheria antitoxin gave specific protection against inhaled toxin. In mice and rats which had been injected subcutaneously with pathogenic trypanosomes, repeated inhalation of antimony tartrate in 2 per cent. solution resulted in some cases in the freeing of the blood from parasites and survival. Antimony poisoning was observed in a few cases.—A. W. STABLEFORTH.

I. FELIX, A., KRIKORIAN, K. S., & REITLER, R. (1935). **The Occurrence of Typhoid Bacilli containing Vi Antigen in Cases of Typhoid Fever and of Vi Antibody in their Sera.**—*J. Hyg., Camb.* **35.** 421-427. 5 tables. [8 refs.]

II. FELIX, A., & PITT, R. M. (1935). **Virulence and Immunogenic Activities of** *B. typhosus* **in Relation to its Antigenic Constituents.**—*Ibid.* 428-436. 3 tables. [16 refs.]

I. The first paper concerns an investigation carried out in Palestine, its objects being to enquire into the occurrence of " Vi " (virulence) antigen in freshly isolated strains of *Salmonella typhi* and into the occurrence of the corresponding " Vi " antibody in the blood serum of typhoid patients and convalescents.

Ninety strains isolated from 90 patients were examined for their agglutinability with pure " H ", " O " and " Vi " serum respectively. Only two out of the 90 strains of *S. typhi* tested were found to be devoid of " Vi " antigen. According to the degree of agglutination with pure " O " antiserum, the 88 strains which contained " Vi " antigen were all of the type of intermediate agglutinability and virulence. The specific " Vi " antigen of *S. typhi* could not be detected in freshly isolated strains of *S. paratyphi* A and B. From previous experiments coupled with these results, the authors conclude that any effective vaccine for typhoid fever must contain " Vi " antigen, that any effective antityphoid serum must contain " Vi " antibody and that no beneficial effect can be expected in using antityphoid serum in patients suffering from paratyphoid fever A or B.

Of 100 sera of patients tested during the pyrexical period of disease, only eight showed the presence of " Vi " antibody, whilst of 17 sera of convalescents, tested on the eve of discharge from hospital, five contained demonstrable " Vi " antibody. There appeared to be no constant relationship between the titres of the " Vi " antibody and those of " O " or " H " antibodies, nor between the clinical course and the appearance or titre of " Vi " antibodies in the patients' blood.

II. The second paper deals with virulence and immunity reactions of *S. typhi* in relation to its antigenic constituents. Whilst it is true that in the typhoid-paratyphoid group of organisms there is a close association between smoothness and virulence and that smooth " O " antigen is of immunological importance, yet the mere presence of smooth " O " antigen does not connote the highest order of virulence of which smooth strains of *S. typhi* are capable. An additional factor, the " Vi " antigen, is required which renders the " O " antigen resistant to the " O " antibody. The present work shows that the " Vi " antigen contained in virulent strains of *S. typhi* is not necessarily lost when the cultures undergo change from smooth to rough. The " Vi " antigen may survive unimpaired or

the " Vi " antigen and the smooth " O " antigen may be lost simultaneously. It is not yet known which of the two alternatives occurs the more often. The virulence of *S. typhi* is shown to depend on the presence in the bacilli of both smooth " O " and " Vi " antigen. Nevertheless, a rough variant possessing " Vi " antigen, although avirulent, could be used successfully for active immunization and for the preparation of a serum of high potency in the passive immunization of mice. The authors thus point out that *S. typhi* provides an example of the diversity of functions assigned to the various antigenic constituents of the bacterial cell.

[These papers and the earlier work of Felix and his colleagues open up a fresh avenue concerning virulence of bacteria. As far as *S. typhi* is concerned, he draws a distinction between the ordinary smooth antigen which is responsible for toxicity and the " Vi " antigen responsible for invasiveness. It remains to be seen whether this is a principle which applies to other bacterial species. If so, then it may explain reasons why vaccines and sera are sometimes of no avail in diseases of animals. It may mean that such vaccines, although apparently possessing the normal somatic antigen, do not possess the antigen responsible for invasiveness. In the case of *S. typhi*, this antigen is impaired by heat, and heat-killed vaccines may in some cases be inefficient because of this impairment].—R. Lovell.

Duncan, J. T. (1935). **Inactivation of the " H " Antigen by Dilute Mineral Acid.**—*Brit. J. exp. Path.* **16.** 405-410. 2 tables.

The agglutinability and antibody-absorbing properties of the " H " antigen of flagellated bacteria are readily destroyed by exposure of the organisms to a suitable weak mineral acid. For example, in a suspension of *Salmonella typhi* (formerly *Bact. typhosum*) of approximately 750 million organisms to 1 c.c., the " H " antigens were rendered inagglutinable in less than one minute at 50°C. by M/1280 hydrochloric acid. The appropriate acid concentration for a particular bacterial suspension can be determined by preliminary titration, using falling concentrations of acid, neutralizing after a period and testing with appropriate serum. Inactivation is rapid at 50°C., less rapid at 18 C. No attempt has been made to compare this method with any other, but the author commends it for its rapidity and simplicity, as it involves no washing nor centrifuging and appears to cause little or no damage to the " O " antigens.—R. Lovell.

Anderson, E. J. M., Fraser, A. H. H., & Mackie, T. J. (1935). **The Influence of Grazing on the Natural Immunity Reactions and Intradermal Toxin Tests in Sheep.**—*J. comp. Path.* **48.** 51-57. 3 figs. [5 refs.]

The authors have compared the trend of certain natural immunity reactions in three groups of sheep, comprising 40 in all, kept under diverse conditions. One group was maintained indoors on a completely dry ration without green food, a second was kept indoors but fed on grass or, when not available, on rape or tares, whilst the third was turned out to graze. At the commencement of the experiment in June there was little difference in the average values for each reaction in the three groups.

At the conclusion of the experiment in October the natural haemolytic activity of sheep serum towards rabbit erythrocytes was found to be significantly higher in the grazing animals than in the sheep on the dry ration. [Up to September, however, the trend was similar]. A similar difference was found in the natural bactericidal action towards *Bact. coli*. No such difference was found in the complementary power of the serum or in the β lysin tested with *Streptococcus haemolyticus*, or in agglutinating power for *Brucella abortus*. The group fed on green food

indoors did not show the same increase as the grazing group. The proportion of sheep which gave a negative reaction to a borderline dose of the toxin of the lamb dysentery bacillus (*Clostridium welchii* Type B, 0·5 c.c. of a 1 : 15,000 and 1 : 7,500 dilution) was greater in the grazing group than in those given green food indoors or kept on a dry ration. The authors note the fact that the sheep fed on green food indoors showed at the end of the experiment an increase of weight averaging only 8 lb. as compared with 15 lb. for those on the dry ration and 22 lb. for those sent to graze.—A. W. STABLEFORTH.

I. GLOTOWA, E. W., OSTROWSKAJA, O. A., SSILANOWA, I. W., & MILASCHEWSKAJA, W. G. (1934). Ueber die Wertbestimmung der Gasödemseren. I. Mitteilung. [**The Standardization of Antiserum against Gas Gangrene. I**].—*Zlb. Bakt. I.* (*Orig.*). **132.** 57-65. 7 tables.

II. GLOTOWA, E. W., OSTROWSKAJA, O. A., & SSILANOWA, I. W. (1935). Ueber die Wertbestimmung der Gasödemseren. II. Mitteilung. [**The Standardization of Antiserum against Gas Gangrene. II**].—*Ibid.* **133.** 415-419. 7 tables.

III. MADSEN, T. (1935). Bemerkungen zur II Mitteilung. " Ueber die Wertbestimmung der Gasödemseren " von E. W. Glotowa, O. A. Ostrowskaja und I. W. Ssilanowa. [**Remarks on the Article " The Standardization of Antiserum against Gas Gangrene " Part II**].—*Ibid.* **134.** 249-250. [2 refs.]

I. & II. The strength of antitoxic serum was measured by the administration of intravenous injections into mice of standard toxin and varying amounts of unknown antitoxin, after the mixtures had stood at room temperature for one hour. Guinea pigs were used to measure the ability of the antiserum to inhibit infection, and the antihaemolytic action of the serum against the lysin of standard toxin was measured *in vitro*. When two samples of *Clostridium welchii* antitoxin were compared by these three methods they appeared to be of identical strength according to the mouse and haemolysis tests, whilst according to the guinea pig test there was only a very slight difference in strength. In further tests, however, the antihaemolytic power of samples of serum bore no relation to the antitoxic content. It is concluded that the intravenous injection of mice with mixtures of antitoxin and standard toxin offers the most suitable method of standardizing *Cl. welchii* antitoxin. In further experiments, equally good results were obtained in the standardization of antitoxin of *Cl. oedematiens*, *Cl. septique* and *Cl. histolyticum* by the intravenous injection of mice. The authors advocate the world-wide adoption of this method for the standardization of clostridium antitoxin.

III. The author states that staphylococcus and pneumococcus antisera may be standardized by the method advocated by GLOTOWA and his co-workers. —E. J. PULLINGER.

SELEVINSKAJA, S. A. (1935). Ueber die Immunität der Meerschweinchen gegen Gasbrand. (Bac. perfringens). [**The Immunity of Guinea Pigs to Gas Gangrene** (*Clostridium welchii*)].—*Zlb. Bakt. I.* (*Orig.*). **134.** 250-254.

It did not prove possible to immunize guinea pigs against *Cl. welchii* with a vaccine consisting of culture containing a 1 per cent. solution of formalin as preservative. Similar failure was experienced with formolized toxin (5 per thousand formalin). Large doses of formolized (5 per thousand) culture vaccine produced a reasonably strong resistance to subsequent infection. The blood of guinea pigs thus immunized did not contain a particularly high antibody content, and the immunity gained is thought to be of a cellular nature.—E. J. PULLINGER.

WEINBERG, M., & DAVESNE, J. (1935). Anticorps du sérum normal vis-à-vis du *Bacillus chauvoei* et du *Vibrion septique*. [**Antibodies for** *Clostridium chauvoei* **and** *Cl. septique* **in Normal Serum**].—*C. R. Soc. Biol. Paris.* **118.** 1412-1414.

Of 31 previously untreated guinea pigs inoculated intramuscularly with 1 c.c. of a 48-hour culture of *Cl. chauvoei*, 25 died and six lived. The serum of three out of nine untreated guinea pigs, in a dose of 0·25 c.c., was found definitely to protect mice against a lethal dose of culture of *Cl. chauvoei*.

Traces of anti-*Cl. septique* immune bodies were demonstrated in three out of 18 horse sera tested; six of the others contained elements anti-toxic to this organism but, in four of them, the result was only partially positive. Twenty-two horse sera tested for anti-*Cl. chauvoei* infection properties showed one positive, four partially positive and 17 negative, but all of 30 horse sera tested contained elements antitoxic to this organism.

Nine out of 17 ox sera showed anti-*Cl. septique* infection bodies, and all of 15 ox sera tested showed a good anti-toxic content against this organism. Against *Cl. chauvoei* infection, 16 were positive, five partly so and three negative. Seventeen ox sera tested against *Cl. chauvoei* toxin all contained antibodies. The authors consider that in the ox the *Cl. chauvoei* toxin is produced in the alimentary tract.

The results of similar tests on human sera are also given.—A. BROWNLEE.

MILLER, H. M., Jr. (1935). **Experiments of Acquired Immunity to a Metazoan Parasite by Use of Non-Specific Worm Material.**—*Amer. J. Hyg.* **21.** 27-34. 3 tables. [3 refs.]

This series of experiments was suggested by the chance observation that an immunity to *Cysticercus fasciolaris* is induced in rats by feeding living onchospheres of *Taenia pisiformis*. Tests carried out on a large number of experimental rats showed that the injection of powdered worm material from *T. taeniaeformis*, *T. saginata*, *Hymenolepis* sp., and *Dipylidium* sp. produced a considerable amount of protection, but powdered *Diphyllobothrium*, *Dipylidium* or *T. pisiformis* did not. The introduction of living *C. fasciolaris* into the abdominal cavity was found to produce complete protection against infection, and a high degree of immunity was also demonstrated in rats which had received living *T. pisiformis* material intraperitoneally. The introduction of living cysticerci into the peritoneal cavity appeared to be much more effective than the injection of powdered material.
—E. L. TAYLOR.

MILLER, H. M., Jr. (1935). **Transmission to Offspring of Immunity Against Infection with a Metazoan (Cestode) Parasite.**—*Amer. J. Hyg.* **21.** 456-461. 3 tables. [3 refs.]

These experiments were carried out to ascertain whether any protection to infestation with *Cysticercus fasciolaris* passes from the parent to the offspring of immune female rats. Females actively immunized by injections of powdered *Taenia taeniaeformis* were used, as well as those experimentally infected by giving the onchospheres *per os*. The observations showed the offspring to be endowed with a considerable degree of resistance to infection, those from actively immunized female rats having a lower degree of resistance than those from infected females. How long the immunity was retained by the offspring was not ascertained. One female which was given a subcutaneous implant of a large cyst was found to be immune when subsequently fed with onchospheres.—E. L. TAYLOR.

DISEASES, GENERAL.

WIEGMANN, E. (1934). Der Einfluss der Luftfeuchtigkeit auf experimentelle Infektionen. [**The Influence of Atmospheric Humidity on Experimental Infection**].—*Inaug. Diss. Hanover.* pp. 48. 2 figs., 5 tables, 6 graphs. [18 refs.]

The introduction to this dissertation is followed by a chapter summarizing the literature relevant to the influence of moisture, temperature and climatic conditions in general upon the spread of infectious diseases amongst man and animals.

Experiments are described in which 240 white mice were kept under different conditions of moisture and temperature and fed with definite amounts of *Bacillus cohaerens*, *Salmonella enteritidis* and *Erysipelothrix rhusiopathiae* mixed with their diet.

The origin and characters of the strain used are described together with the method of housing the mice and the technique of regulating the humidity and temperature.

Half the mice were exposed to a temperature of between 9° and 10°C., 40 of these being kept in an atmosphere saturated with water vapour, 40 in an atmosphere of about 84 per cent. saturation and the remainder in an atmosphere containing only 60 per cent. water vapour. The other half of the mice were divided up similarly and kept under similar atmospheric conditions, but the temperature was maintained at 20·1°C. Each series of 40 was again subdivided into groups of ten which were respectively fed doses of the above organisms, ten being left as controls.

The total mortality and the time required to kill each mouse is recorded for each group.

The following table shows the total number of days survived by those animals in each group which died as the result of infection.

Humidity	*B. cohaerens*		*S. enteritidis*		*E. rhusiopathiae*		Control	
	10°C.	20°C.	10°C.	20°C.	10°C.	20°C.	10°C.	20°C.
Max. 100%	199	219	66	80	151	59	310	287
Min. 60 %	254	145	92	94	237	136	310	273
Normal 84%	266	252	65	90	243	160	310	310

Although no conclusions can be drawn from the *S. enteritidis* group, a comparison of the results in the other two groups of the table indicates that animals succumb earlier to infection in an atmosphere saturated with water vapour, though this is less marked under the conditions of the higher temperature.—N. S. BARRON.

WICKWARE, A. B. (1934). **The Relationship of Parasitism to the Poultry Industry.** —*Sci. Agric.* **15.** 178-180.

In this article stress is laid upon the importance of preventive measures in the control of parasitism. It is stated that keeping birds in confinement, together with the daily removal of droppings for a week or ten days, has to a large extent robbed coccidiosis of its terrors [this is contrary to current experience].

In flocks heavily parasitized it is recommended that, after the peak of produc-

tion has passed and a sufficient number of eggs have been selected for hatching, all adult birds be killed off and marketed. It is pointed out that this procedure also aids in the control of other infectious disease.—W. J. IRONSIDE.

LERENA, C. A. (1935). Contribución recordativa de la grave epizootia de rino-laringo-traqueitis desarrollada en los equinos del país en el año 1930. [**A Record of the Serious Epidemic of Rhino-Laryngotracheitis in Horses in the Argentine in 1930**].—*Rev. zootéc.* **22.** 59-70.

The greater part of this article consists of abstracts from the lay press to emphasize the alarming nature of the disease. It was characterized by ease of transmission by contact, inflammation of the mucous membranes of the nose, larynx and trachea, and by a dry cough which later became moist. About 3 per cent. of animals affected developed broncho-pneumonia and a small number died. The degree of fever varied but was usually slight. No results of interest were obtained from bacteriological examinations. Injection of convalescent serum was of no value. The disease has not recurred.—R. S. ROBERTS.

DIMOCK, W. W. (1935). **Breeding Problems in Mares.**—*Cornell Vet.* **25.** 165-176.

Sterility, delayed conception, abortion and diseases of the newly-born foal are the most common and most serious problems associated with brood mares. The author deals with the respective causes and indicates methods of diagnosis, treatment and prevention. "On those breeding farms where strict measures regarding breeding hygiene have been adopted and rigidly followed, the breeding efficiency has been increased and the loss of foals reduced."—P. L. SHANKS.

RINJARD, P. (1935). Contribution à l'étude de l'étiologie du coryza gangréneux. Conditions de conservation du virus. [**The Aetiology of Malignant Bovine Catarrh**].—*Rec. Méd. vét.* **111.** 391-406. 2 figs. [8 refs.]

A detailed discussion of the theory that the sheep is a carrier of malignant bovine catarrh. It is to be remembered that research along lines appropriate to bacterial and virus diseases has proved uniformly negative at the hands of many workers. Rinjard, however, still believes that the exciting cause is some form of "virus" which becomes domiciled in sheep which come in contact with cattle, and that some further agent – insect or otherwise – may transmit the virus from sheep to cattle.

An experiment was carried out to test the sheep carrier theory; during its course, one fatal case, diagnosed as typical malignant catarrh, occurred in a heifer, but two control calves placed in much closer contact with the sheep than the dead heifer remained perfectly well. A repetition of this experiment during the next winter season gave negative results.—J. E.

SALOMON, S. (1935). "Festliegen des Rindes." (Beiträge zur Klinik und Pathologie der Neurofibromatose und der Leukose). [**Recumbency in Cattle. Research on Neurofibromatosis and Leucosis**].—*Berl. tierärztl. Wschr.* **51.** 469-470. 1 fig.

Several cases are described of bovines which showed leucaemic foci in various tissues [see this *Bull.* **4.** 767.], but in addition elongated foci of hyperplasia of lymphoid tissue situated in the epidural space have been noted. Five such cases are described; in some cases the foci were 10 to 15 cm. long and caused considerable pressure on the spinal cord. This pressure produced varying degrees of paralysis which gave rise to the symptom of recumbency shown by these animals. To decide whether a nodule is a hyperplastic focus or a neurofibroma, resort to

histological examination must be made, but the occurrence of lymphoid hyperplasia in other organs is suggestive of a similar lesion affecting the central nervous system.—E. J. PULLINGER.

DATTA, S. C. A. (1934). **The Etiology of Enzootic Bovine Haematuria. A Preliminary Note.**—*Vet. Rec.* **14.** 1356-1357. 1 fig.

A short note describing the protozoan organism found in the bladder of cases of haematuria in India.—J. E.

DATTA, S. C. A. (1934). **The Etiology of Enzootic Bovine Haematuria, Part I.** —*Indian J. vet. Sci.* **4.** 341-361. 35 figs. on 12 plates. [52 refs.]

In the course of investigations into enzootic bovine haematuria the author encountered globular bodies in the urine of affected animals which gave a " definite host reaction " against the " bodies ".

These bodies are usually spheroidal in shape ; occasional prolongations of the protoplasm, interpreted by the author as pseudopodia, are met with. Differentiation into endoplasm and ectoplasm is not discernible in sections. The nucleus is vesicular and possesses a centrally situated dot interpreted as a karyosome. The nuclear membrane is very definite and presents a series of bead-like granules of chromatin. The bodies may attain a length of 60μ and a breadth of 40μ. Contractile vacuoles do not appear to be present, but chromatoid bodies and glycogen vacuoles are occasionally found, and granules of blood pigment and ingested erythrocytes have been seen in the cytoplasm.

Rare cysts which possess a double-contoured capsule and are smaller than the free stages are encountered in section. The author considers that the size and the character of the nucleus indicate the parasitic nature of these bodies and distinguish them from body cells but, when examined in the fresh condition, the parasites have shown no attempt to cross the stage nor has retraction and protusion of processes been seen. It is suggested that they appear in the urine in a somewhat moribund state. In view of the character of the nucleus it is considered that the parasite belongs to the genus *Entamoeba* and the name *E. kamala* is suggested.

The article also includes a description of the disease, an account of the histopathology and notes on clinical and chemical studies.—U. F. RICHARDSON.

CLAY, A. Z. (1934). **Clinical Observations of an Outbreak of Infectious Catarrh.** —*Aust. vet. J.* **10.** 177-180.

A detailed clinical description is given of an outbreak of infectious catarrh affecting pullets and cockerels on one section of a large poultry farm. Deaths amounted to 370 (44 per cent.) of the birds in the section affected. Severe general symptoms were shown, together with marked inflammatory reactions of the conjunctiva and nasal mucous membrane. *Post-mortem* examinations revealed laryngotracheitis as the constant and principal lesion. Diseased birds rapidly improved when fine, dry weather occurred, and the disease cleared up. - W. I. B. B.

DYBING, O. (1935). Ovariesvulster hos husdyrene. [**Ovarian Neoplasms in Domestic Animals**].—*Norsk VetTidsskr.* **47.** 181-194, 246-263 and 309-325. 7 figs. [33 refs.]

After having discussed the problem of nomenclature of ovarian neoplasms in both veterinary and human pathology, the author gives details concerning the histogenetical and morphological structure of an ovarian neoplasm. Attention is drawn to the lack of clinical observations in animals suffering from ovarian neoplasms, which makes correct diagnosis difficult. 104 cases described in the

literature have been collected and dealt with statistically. The author then gives detailed descriptions of 31 cases (seven mares, 14 cows, one bitch, five sows and four hens) which, from 1888 onwards, have been recorded by the Pathological Department of the Royal Veterinary College, Copenhagen. He has re-examined each case microscopically and diagnosed 15 to be carcinomata (12 cows and three hens), seven to be cystic-adenomata, adenocarcinomata or cystic-carcinomata (five mares, one cow and one bitch), four to be sarcomata (one cow and three sows) and three to be angiomatous neoplasms (two sows and one hen). Owing to bad preservation of the tissues, two of the cases were unfit for exact determination.
—GUSTAV NAERLAND (FARSUND).

DOVE, W. F. (1935). **Classification of Chick-Embryo Positions at Different Ages and Malposition as a Cause of Mortality.**—*J. agric. Res.* **50.** 923-931. 1 fig., 4 tables. [7 refs.]

A systematic classification of the positions taken by normal hatchable chick embryos and by those dead-in-shell shows that position as such is not always the real cause for failure to hatch. Faults in breeding, nutrition of the hen, and in incubation may bring about retardation in the normal development and shift of the embryo. A large number of the embryos that fail to hatch are in positions which can be considered as the after-effect of some fundamental defect.

A position code is given by which it is possible to describe the exact position of any embryo from 15 to 21 days of age.—R. F. GORDON.

OAKLEY, C. L. (1935). **Lymphomatosis.**—*Proc. R. Soc. Med.* **28.** 999-1002. [1 ref.]

The author subdivides this disease into three main types, any or all of which may be present in the same fowls.

(1) THE PARALYTIC TYPE.—Here the symptoms depend upon the nerves involved ; weakness or paralysis of various muscles occur or, if the autonomic nervous system is involved, disorders of digestion and nutrition or cardiac failure occur. Changes occur in the peripheral nerves or occasionally in the central nervous system. The affected nerves show fusiform or nodular yellowish-grey translucent swellings.

(2) THE VISCERAL OR TUMOROUS TYPE.—Usually no symptoms are observed apart from emaciation. On *post-mortem* examination two types of lesion are found :– (a) multiple soft pinkish-grey nodules in any or all of the organs, and (b) a diffuse infiltration and replacement of the organs, usually found in the liver, spleen, lung, ovary and thyroid.

(3) THE OCULAR TYPE.—This is shown by a change of colour of the iris from orange to bluish-grey, often without deformity of the pupil though, owing to replacement of the choroid, blindness is common.

The histology of all three types is consistent. The infiltrations consist almost entirely of cells of the lymphoid series, usually young lymphoblasts. A true leucaemia is probably never present.

Numerous theories are held regarding the cause of this disease, all of which can be reduced to two :– (1) the infective, and (2) the neoplastic. The evidence in favour of the infective theory is small and attempts to transmit the disease in fowls have given variable results. Intestinal parasites do not appear to be the primary cause.

The author inclines to the neoplastic view and stresses the possibility of there being a hereditary factor.—R. F. GORDON.

JUNGHERR, E. (1935). **The Etiologic and Diagnostic Aspects of the Fowl Paralysis Problem.**—*J. Amer. vet. med. Ass.* **86.** 424-432. 3 figs. [18 refs.]

The findings of several workers are discussed. The author considers that the contention that the disease is caused by parasitic or nutritional injuries of the alimentary canal is not supported by experimental evidence and that the genetic aspects of the disease are incompletely understood. It is possible that factors of non-specific irritation and hereditary constitution play a contributing role in the natural occurrence of the disease.

The causative factor of the disorder is considered to be a filter-passing, transmissible agent which is rarely transmitted under natural conditions.

The diagnosis of field cases of neurolymphomatosis can be somewhat facilitated by total and differential leucocytic counts, mercury bichloride and modified guttadiaphot tests.

The author takes care to state that all of these tests may give false positive and false negative reactions, as do other non-specific tests. The quickest and most certain method now available is the demonstration of characteristic macroscopic changes in the peripheral nervous system.

Prophylactic measures should probably take into account the selection of progeny from stock known to be disease-free and of proved viability, and the control of diseases during the growing period by sanitation.—NORMAN DOBSON.

ELDER, C. (1935). **Avitaminosis A in Swine.**—*J. Amer. vet. med. Ass.* **87.** 22-30. 4 figs. [1 ref.]

Avitaminosis A has been observed in pigs of over 120 lb. weight, producing an inco-ordination of the hind limbs and, in bad cases, involvement of the fore limbs. The pigs are very nervous, but show no fever and the appetite remains good. In severe cases paralysis of the hind limbs is observed.

In the cases studied, the pigs had been fed with the same type of ration for four years, though the disease only occurred in the third year. The diet contained alfalfa meal which was thought to supply a sufficiency of vitamin A.

No lesions were observed at *post-mortem* examination though microscopically there was a fatty degeneration of the spinal cord and sciatic nerves. This degeneration was observed only in early cases.

Experimentally produced vitamin A-deficient pigs were divided into four groups. One group acted as controls and the remainder received respectively cod liver oil, fresh green food cut daily, and alfalfa hay. A marked recovery was observed within a fortnight in all the three groups receiving the supplementary diet, the pigs on cod liver oil making the most rapid recoveries.—N. H. BROOKSBANK.

MORELL, G. (1935). La maladie de Barlow spontanée chez le chien. **[Spontaneous Scurvy in the Dog].**—*Thesis for Docteur vétérinaire, Lyons.* pp. 88. [78 refs.]

The main part of this thesis (73 pages) is an interesting survey of the knowledge of scurvy in man and animals as ascertained by research into published work. In carnivores, as in other species, it is the young which are most commonly affected. The chief symptoms described are anaemia combined with pain on movement and on handling. Enlargements due to sub-periosteal haemorrhages are said to occur in the region of the union of the epiphysis with the diaphysis, particularly in long limb bones.

The work is illustrated with details of four cases, in two of which symptoms of rickets were also present. Appropriate treatment for both conditions was adopted in each instance with successful results. It is not possible to form a definite conclusion on a few isolated cases, and this is rendered even more difficult when two diseases co-exist.—J. W. H. HOLMES.

PUBLIC HEALTH.

—. (1935). Organisation du Service Sanitaire en France. Rapport de la Commission chargée de l'examen du projet de M. André Bouchet. [**Organization of the Public Health Service in France**].—*Bull. Soc. vét. prat. Paris.* **19.** 155-161.

Reorganization of the veterinary services in France has been proposed by BOUCHET, who states that a transformation is absolutely necessary with regard to the prophylaxis of disease in all domestic animals, protection against introduction of contagious disease into the country, control of the import and export of all animal products, and the control of stables, cow-sheds, etc., so as to ensure a pure milk supply.

In order to do this effectively, he argues that it must be done by a government-controlled veterinary service. Amongst reasons given, he emphasizes the necessity of independence of officials and freedom from local influence. The cost of maintaining such a veterinary service appears to be the chief obstacle ; he proposes that this should be overcome by making a small charge per kilo on all meat and milk produced. This would not be a burden on producers and is in operation in many countries in connexion with meat inspection. He states that the difficulty of examining all meat in the small private abattoirs could be overcome by the appointment of " verificateurs des viandes " as is in operation at present in Alsace and Loraine [like Detention Officers in Scotland] and, wherever possible, the erection of communal abattoirs in order to centralize the places of slaughter. Instances are given where organization on such lines has given good results for many years in France, e.g. Herault and Seine-et-Marne.

DAVESNE discusses control by means of a whole-time service and also by means of utilizing the services of local veterinary practitioners, as is in course of organization in English counties with regard to tuberculosis, milk and dairies and contagious diseases.

The following recommendations are made :– the immediate closing of private abattoirs, especially in important centres ; the progressive closing of private abattoirs in small communes and their replacement by the erection of inter-communal abattoirs, and the suppression of the use of meat of very low quality, such as is at present made into sausages, etc.—T. DUNLOP YOUNG.

BORMAN, E. K., WEST, D. Evelyn, & MICKLE, F. L. (1935). **Laboratory Examinations of Milk Handlers.**—*Amer. J. publ. Hlth.* **25.** 557-570. 2 tables. [30 refs.]

—. (1935). **Laboratory Examination of Milk Handlers.**—*Brit. med. J.* June 29th. 1324. [1 ref.]

The authors describe an investigation carried out in connexion with the presence of carriers and cases of infectious disease among milk handlers. During the years 1910 to 1933, the following outbreaks of milk-borne disease were recorded in the United States of America : typhoid fever, 574 outbreaks ; septic sore throat, 81 outbreaks causing among other cases 226 deaths ; scarlet fever, 72 outbreaks and diphtheria, 33 outbreaks. These figures are probably below the real number since all outbreaks were not traced to their true origin, but they indicate the importance of milk contamination due to human carriers, and the question arises as to how to prevent milk-borne disease of this type among those engaged in dairy work.

For the past few years the state of Connecticut has insisted on physical and bacteriological examination of handlers of certain grades of milk. Over a period

of six years and five months, 91,257 laboratory examinations were made; 71 carriers of pathogenic or partially pathogenic organisms were detected. The authors are strongly in favour of universal pasteurization, but they anticipate that this will not be generally carried out in the near future and that steps should be taken to protect the milk supply from human contamination. They recommend a physical examination and a careful enquiry into the history of infectious disease outbreaks. They further recommend a series of examinations of faeces for organisms of the enteric group, supplemented by urine examinations and examinations of throat and nose cultures for virulent diphtheria bacilli. Any person harbouring large numbers of these organisms should be regarded as dangerous. In the examinations carried out they found that approximately 1 per cent. of all cultures examined from throats were positive. Based upon statistics for the United States from 1880 to 1933, they conclude that streptococcus infections have been responsible for almost four times as many cases as have the enteric infections. Diphtheria has been relatively unimportant as a milk-borne disease from a national point of view. Periodical physical examinations of milk handlers are desirable in the case of raw milk handlers and employees of pasteurization plants. In Connecticut, milk handlers found positive for typical β haemolytic streptococci are prevented from handling milk. A series of faeces examinations for organisms of the enteric group should be made before or at the beginning of employment, and urine examinations should be made for the same purpose. Where diphtheria is prevalent, swabs from the throat and nose should be examined to detect persistent carriers of these organisms.—BRENNAN DEVINE.

KLEIN, L. A., & LEARMONTH, R. (1935). **Significance of Streptococci, and a High Leukocyte Count, H-Ion Concentration and Chlorine Content in Cow's Milk.**—*J. Amer. vet. med. Ass.* **86.** 600-619. 8 tables. [19 refs.]

The authors give at some length the results of a study of the diagnostic value of clinical examination, leucocyte counts, and chloride tests in 46 cows in two herds, about half of which were originally infected with mastitis streptococci (49 quarters) or which became infected during the course of the investigation (26 quarters). The animals were so chosen that cows of different ages and stages of lactation were represented in each group. All were free from tuberculosis and contagious abortion. The findings are in accord with those of most previous workers, the salient point being that latent infection was frequent, that in latently infected cows, positive evidence by these tests, i.e. a leucocyte count above one million, a pH value above 6·8 and a chlorine figure of 0·14 per cent. or more, was at times absent, whilst on the other hand, evidence was often present in non-infected cows, and that in cows with normal non-infected udders these tests were more often positive in the early and late stages of lactation than in the intermediate stages. Finally, the tests showed a definitely greater incidence in non-infected normal udders as the cows became older, i.e. from the fourth or fifth lactation onwards. Limited areas of induration were much more common in infected cows. Flakes were relatively more common in infected cows but were not frequently observed.—A. W. STABLEFORTH.

I. —. (1935). **Food Poisoning. Steps to be taken by Medical Officers of Health (Outside London) in Suspected Food Poisoning Cases.**—*Min. Hlth Memo.* 188/Med. pp. 11. London: H.M. Stat. Off. [2d.]

II. —. (1935). **Food Poisoning.**—*Lancet.* **229.** 89-90.

I. The memorandum divides food poisoning into two classes:—(1) cases due to contamination of food by poisonous chemicals, and (2) cases due to bacterial infection of food especially with food of animal origin.

Recommendations are made regarding the methods of investigation and the collection of material, it being especially important to secure samples of any remaining portions of food actually consumed by persons attacked.

As regards any necessary bacteriological examination, it is pointed out that arrangements should be made beforehand so as to avoid delay and the trouble of making special emergency arrangements. A useful appendix is attached giving hints on the isolation and identification of salmonella types for the benefit of public health bacteriologists having to deal with such material. The methods advocated include isolation by means of McConkey's agar and brilliant green. Identification may be carried out by slide agglutination, picking off suspected salmonella colonies and emulsifying them in diluted sera. It is important to have a set of routine sera containing a group-phase salmonella serum, a serum prepared against *Salmonella enteritidis* and, in addition, a set of type-specific sera, the group agglutinins having been absorbed. Should no type-specific colonies be found, phase-dissociation can often be speeded up, provided the organism is diphasic, by sub-culturing in broth containing about 10 per cent. of a group serum.

It is advisable to confirm the findings by culturing and testing some of the colonies, but rapid identification is important and may have some practical bearing on the outbreak. Complete identification of an atypical strain is an elaborate piece of serological work.

II. In commenting on the above memorandum this annotation emphasizes the importance of the time factor in investigations of this type. It is pointed out that the Medical Officer of Health is to report any serious outbreak of disease to the Ministry, but is free to carry out the inquiry on his own lines. Every year from 40 to 70 outbreaks are reported to the Ministry of Health and in 1933 there were 66 outbreaks so reported, with 15 deaths due to the salmonella group alone.

—R. Lovell.

Wagemann, H. (1935). Bisherige Erfahrungen mit dem abgekürzten Gefrierverfahren zur Tauglichmachung finnigen Rindfleisches. [**The Quick Freezing Method for the Destruction of Cysticerci in Beef**].—*Berl. tierärztl. Wschr.* **51.** 458-459. [3 refs.]

Ordinary meat inspection procedures have been relatively unsuccessful in the control of *Cysticercus bovis*. This may have been due in part to inspection methods allowing lightly infested carcasses to pass unrecognized, but doubtless has depended, to a greater extent, upon imperfect sterilization of infected meat. The new method of holding the meat at a temperature of -3°C. for 24 hours promises to be much more effective ; a freezing room at –7° to –8°C. is required and a thawing room at 0° to 4°C., the whole process requiring only 12 to 14 days, as compared with 21 days where the meat is chilled at a temperature of +4°C. An additional benefit is that the loss of weight from evaporation is lower.—E. L. T.

Keller, H. (1935). Ueber die Messung der Innentemperatur finniger Fleischviertel bei dem neuen Gefrierverfahren. [**The Measurement of the Internal Temperature of Meat in Cold Storage**].—*Z. Fleisch- u. Milchhyg.* **45.** 321-322. 1 fig. [1 ref.]

This paper describes a new type of thermometer for measuring the deep temperature in meat kept in cold storage for the killing of *Trichinella spiralis*. It consists of a case deep enough to hold the whole of the thermometer, fitted with a cork at the top and having a sharp point at the bottom to thrust into the meat. At the upper end is a cross piece like the guard on a sword to facilitate insertion and extraction from the meat. A small amount of glycerin is placed in the case

to act as a conductor of heat between the thermometer and the case wall, which is in contact with the meat.—E. L. TAYLOR.

THERAPEUTICS.

COLEMAN, F. F. (1934). **Veterinary Medicines, 1934.**—*Rep. Dep. Agric. Qd. 1933-1934.* pp. 131-136. 1 table.

The veterinary Medicines Act of 1933 came into force early in 1934. Briefly, the Act provides for a critical examination by a board of statutory declarations setting out the formulae and other particulars of the veterinary medicines available for sale to the public, and also examination of the printed labels that must be attached to such medicines. Anyone intending to sell veterinary medicines must obtain a licence and apply for registration of the medicines. Certain drugs, if contained in the medicine, must be declared on the label and the proportion stated. Some 340 medicines have been submitted for registration and about 240 of these were accepted. Those not accepted were not considered to be labelled in accordance with the Act's requirements, in most cases owing to extravagant claims being made. Claims cannot be made to cure diseases which are known to be incurable at the present time. The table gives particulars of medicines registered.—W. I. B. BEVERIDGE.

JACOTOT, H., & NGUYEN-DINH-LAM. (1935). Sur le traitement du surra des boeufs par le naganol. [**The Treatment of Bovine Surra with " Naganol "**]. —*Bull. Soc. Path. exot.* **28.** 265-268. [3 refs.]

The authors record the treatment of three severe cases of surra in bulls, one with " naganol ", " sulfarsenol " and serum " from a calf experimentally infected with surra some months previously ", one with " naganol " and " sulfarsenol ", and the third with " naganol " alone. The " naganol " was given intramuscularly, an initial dose of 3 g. being followed, after a week's interval, with doses of 1·8 g. given at intervals of three days. All three animals made a clinical recovery, the trypanosomes disappeared from the peripheral blood and subinoculation of blood into horses failed to cause infection.—U. F. RICHARDSON.

VON JANCSÓ, N., & VON JANCSÓ, H. (1934). Mikrobiologische Grundlagen der chemotherapeutischen Wirkung. I. Mitteilung: Wirkungsmechanismus des Germanins (Bayer 205) bei Trypanosomen. [**Microbiological Foundations for Chemotherapeutic Action. I. The Mode of Action of "Germanin" (" Bayer 205 ") on Trypanosomes**].—*Zlb. Bakt. I. (Orig.).* **132.** 257-292. 12 figs., 4 tables. [52 refs.]

As the result of experiments on the action of " germanin " on strains of *Tryp. brucei in vitro* and *in vivo*, the authors conclude that this drug is trypanocidal *in vitro* at a dilution of approximately 1 : 60,000, but that its action is delayed and may not be apparent for over 24 hours. In rats and mice in which the spleen had been extirpated to avoid antibody formation, and copper had been injected to paralyze the reticulo-endothelial system and the mechanism of phagocytosis, the action of the drug was delayed for 24 to 44 hours, and degenerate forms of trypanosomes, characterized by failure to complete the process of multiplication, were encountered in the blood. In normal animals the action of the drug becomes evident in 15 to 24 hours, and only a few degenerate forms are encountered, as devitalized parasites are removed by phagocytosis. " Germanin " appears to act as an opsonin in normal animals, but *in vitro* and in animals in which the defence

mechanism has been excluded, it also has a trypanocidal effect which is ascribed to its interference with the absorption of food by the trypanosomes.

It is interesting that the authors were able to keep trypanosomes alive in suspensions for as long as 56 hours at 37°C. For this purpose they used sheep serum which was diluted with an equal quantity of Ringer's solution, filtered and inactivated, and then further diluted with nine times the quantity of 0·02 per cent. glucose solution.—U. F. RICHARDSON.

MONCORPS, C., & BOHNSTEDT, R. M. (1934). Ueber den Einfluss des reduzierten Glutathion auf die kurative Neosalvarsanwirkung bei der naganakranken Maus. **[Influence of Reduced Glutathione on the Curative Action of Salvarsan in Nagana-Infected Mice]**.—*Arch. Derm. Syph., Wien.* **170.** 26-32. 3 figs. [Copied *verbatim* from *Trop. Dis. Bull.* **31.** 581. Signed W. Y.]

In this investigation the authors have inquired whether glutathione has any action on trypanosomes *in vitro*, whether it influences the course of nagana infection in mice, and finally whether it in any way interferes with the result of treating nagana-infected mice with salvarsan. As the result of their experiments they found :–

1. That in nagana-infected mice the incubation period was shortened, and death occurred more quickly, when the infected blood was mixed with glutathione before injection.

2. That the previous treatment of a trypanosome suspension with a mixture of glutathione and salvarsan produced a more rapid infection than did a suspension of trypanosomes treated only with salvarsan.

3. *In vitro* the motility of the trypanosomes was lengthened by the addition of glutathione, and the inhibitory action of salvarsan was destroyed by it.

4. In nagana-infected mice the trypanocidal action of neosalvarsan was sometimes increased and sometimes inhibited by the simultaneous administration of glutathione, according to the quantity given and to the method of its administration.

STRANGEWAYS, Winifred I. (1935). **Trypanocidal Action of Two Arsenicals, K.324 and K.352, on Infections in Mice and Rabbits.**—*Ann. trop. Med. Parasit.* **29.** 231-254. 9 tables. [7 refs.]

This article records experiments on the value of K324, di (β-carboxy-β-aminoethyl) benzamide-p-thioarsinite, and K352, diglutathionyl-4-acetamino-2-hydroxyphenyl thioarsinite, in infections of mice with *Tryp. brucei*, *T. rhodesiense*, *T. equiperdum*, *T. gambiense* and *T. congolense*, and in infections of rabbits with *T. rhodesiense*. The drugs were effective in curing infections with trypanosomes of the *brucei* group in mice, but they had no value in infection with *T. congolense*. Rabbits infected with *T. rhodesiense* could be cured with a short course of three to eight injections with small doses of the drugs, and in some cases cure was effected with a single dose. The toxic dose of K324 for mice was found to be 0·075 mg. per g. body weight and of K352, 0·2 mg. per g. Both drugs were curative to mice infected with *T. brucei* at doses of 0·0075 mg. per g. body weight.—U. F. R.

BROWNING, C. H., GULBRANSEN, R., & MCCARTNEY, W. (1935). **The Trypanocidal Action of Certain Styryl Selenazole Compounds.**—*J. Pharmacol.* **54.** 367-370. 1 table. [5 refs.]

This article records the testing of the trypanocidal power *in vivo* of the selenazole analogues of styryl quinoline and styryl benzthiazole, which had proved

powerfully trypanocidal *in vitro*. One of the selenazole compounds proved capable of slightly prolonging the life of mice infected with *Tryp. brucei*, but the other proved entirely inactive.—U. F. RICHARDSON.

CERNAIANU, C., & SCHULDNER, J. (1935). Die Piroplasmose der Schafe in Rumänien und ihre Behandlung mit Trypaflavin (Bayer) und Acaprin (Bayer). [**The Treatment of Ovine Piroplasmosis with "Trypaflavine" and "Acaprin" in Rumania**].—*Dtsch. tierärztl. Wschr.* **43.** 518-519. [10 refs.]

This article records the experimental treatment of three sheep, infected with *Babesia ovis*, with "trypaflavine", and two similar sheep with "acaprin". The first three animals were given 0·15 g. of "trypaflavine" intravenously, and within 24 hours the temperature had returned to normal. All three animals recovered. "Acaprin", in doses of 0·1 g. was given to one sheep intravenously, and to the other intramuscularly. The first animal exhibited toxic symptoms and died; the second animal made a gradual recovery. The authors point out that "trypaflavine" can only be given intravenously, which is a grave disadvantage in the treatment of sheep in large numbers. It is proposed to undertake treatment with "acaprin" on a large scale.—U. F. RICHARDSON.

ROCH, W. (1935). Praktische Erfarhrungen im Kampf gegen die Piroplasmose der Rinder mit Hilfe des "Acaprin". [**Field Experience of the Use of "Acaprin" against Bovine Piroplasmosis**].—*Münch. tierärztl. Wschr.* **86.** 361-363.

The author records the satisfactory results obtained during the last two years in the treatment of redwater (*Babesia bovis* infection) with "acaprin". He estimated that there had been an annual case incidence of 20 to 30 with a mortality of 10 per cent. until the adoption of "acaprin" treatment, since when 48 cattle have been treated without a single death. The routine treatment adopted has been the daily administration of 0·25 g. of "acaprin" by the mouth until the urine returns to its normal condition. Severe cases were given a preliminary subcutaneous or intramuscular injection of 1 or 2 c.c. of a 5 per cent. solution of "acaprin" before being placed on the routine treatment.—U. F. RICHARDSON.

I. FISCHL, V., & SINGER, E. (1934). Die Wirkungsweise chemotherapeutisch verwendeter Farbstoffe. [**The Mechanism of Action of Chemotherapeutic Dyes**].—*Z. Hyg. InfektKr.* **116.** 348-355. 2 figs., 1 table. [19 refs.]

II. SINGER, E., & FISCHL, V. (1934). Weitere Versuche ueber die Wirkung von Arzneimitteln in vitro. [**Further Experiments on the Action of Drugs *in vitro***].—*Ibid.* 356-360. [15 refs.]

I. The authors criticize the assumption of VON JANCSÓ [(1932). *Zlb. Bakt. I. (Orig.).* **124.** 167.] that the curative power of a drug corresponds with its trypanocidal activity *in vitro*, its photodynamic activity and its power of destroying the blepharoplast, on the grounds that his control dye was not sufficiently closely related to "trypaflavine", and they record experiments in which the action of "trypaflavine" is compared with that of "atebrin". These drugs have a very similar composition but "atebrin" has no curative value in *Trypanosoma brucei* infections. At the same time they endeavoured to ascertain whether the action of dyes depended on the same three phases which they had established for metallic drugs :– absorption, formation of a poisonous substance by the absorbed drug, and completion of cure by the host defence mechanism.

Under the fluorescence microscope, trypanosomes from mice, one minute

after treatment with " trypaflavine " and " atebrin " respectively, showed that the drug had been absorbed in both cases but, in the case of " trypaflavine ", there was a marked affinity for the blepharoplast. Both drugs were stored selectively in the trypanosomes, as the plasma and blood cells contained little of them, and, on collection of the trypanosomes by centrifugation, the drug colours could be seen by the naked eye in the flagellate deposit. On exposure of trypanosomes to " trypaflavine " for 15 minutes in the dark, normal organisms had lost their motility and become granulated, whilst organisms of a drug-fast strain appeared to be unchanged. Neither strain was able to cause infection. Organisms exposed to " atebrin " were still capable of causing infection. The authors consider that doubt must be thrown on results judged by loss of motility, as that quality and the quality of infectivity are not necessarily connected, and non-motile organisms may be still infective.

When the two drugs were administered to canaries affected with bird malaria, all the plasmodia from the bird treated with " atebrin " showed marked fluorescence, but with " trypaflavine " only the free plasmodia were markedly affected, the intracellular organisms showing little or no alteration. The authors conclude that curative action is independent of trypanocidal action *in vitro* and of photodynamic activity, and of activity in injury of the blepharoplast, though all four depend on drug absorption. The mechanism of cure has the same three phases as those described for metallic drugs.

II. The second paper deals with experiments undertaken to ascertain what substance is responsible for the increased arsenic absorption, by various organisms and inorganic particles, from a solution of " atoxyl " which had been digested with liver pulp. *Spirochaeta recurrentis* and *Tryp. brucei* were exposed to solutions of " atoxyl " and " sulfoharnstoff " to which various substances were added. It was found that " sulfoharnstoff " to which ascorbic acid had been added destroyed both the spirochaetes and the trypanosomes, whilst ascorbic acid alone at a strength of 1 : 800 destroyed trypanosomes but not spirochaetes.—U. F. Richardson.

Kerr, W. R., & Common, R. H. (1935). **The Effects of Certain Acid Treatments for Coccidiosis on the H Ion Content of the Fowl's Intestine.**—*Vet. J.* **91.** 309-311. 2 tables. [7 refs.]

The pH determinations were made by means of a quinhydrone electrode. The gizzard contents were found to have much the highest acidity, but this is reduced immediately the food enters the duodenum to about pH 6·3. The reaction in the small intestine is about the same, except that the last third tends towards neutrality or slight alkalinity.

The evidence that the various " acid treatments " for avian coccidiosis are beneficial is open to doubt. It has been generally supposed that these treatments bring about an increase in intestinal acidity.

The work now reported indicates that the feeding of these " acid " agents to fowls, according to the recommendations for treatment of coccidiosis, does not render the intestinal contents more acid than normally. Therefore, if these agents are of benefit, the explanation must be sought elsewhere and the suggestion is made that, in the case of milk preparations, the good results claimed may, in some measure, have been due to the nutritive properties of the milk.—Norman Dobson.

Bertling, J. (1934). Die Behandlung der Coccenmastitis der Rinder durch Spülungen und Infusionen mit Entozon. [**The Treatment of Bovine Streptococcal Mastitis by Irrigation and Infusion with " Entozon "**].—*Inaug. Diss. Hanover.* pp. 48. [17 refs.]

Bertling reports that cure was effected by one or two injections of 1 : 1,000 " entozon " *via* the teat canal in 25 out of 29 mild cases of catarrhal " coccal " mastitis and 25 out of 37 cases in which the milk was markedly altered and in which interstitial changes were present in the udder. The solution was apparently usually left in the udder for three to five minutes in lactating animals unless they were badly affected and three minutes to several hours in badly affected or dry cows. In the mild cases an irrigation of the milk cistern only with 200 to 300 c.c. was often effective, but in severe cases an irrigation of 1,000 c.c. followed by massage was necessary. Treatment during the drying or dry stage is preferred.

[The diagnosis of infection before and after treatment was made on the basis of clinical and microscopic findings only, methods which are now recognized on all sides as insufficient. The fact that all of the cows were microscopically positive before treatment, i.e., that they were probably moderately severe or advanced cases, and that they were negative for a considerable period afterwards is not without significance, but before the term " cure " can properly be used, a searching cultural examination is necessary].—A. W. STABLEFORTH.

—. (1934). **Worms in Sheep. A New Automatic Drencher.**—*Qd agric. J.* **41.** 48-50. 2 plates.

A brief description is given of an automatic drenching gun for the administration of fluids to sheep. The apparatus comprises a gun with knapsack container. The gun is adapted to give doses of 1 or 2 oz. [Actually this article confuses two separate types of drenching gun].—H. McL. GORDON.

HARWOOD, P. D. (1934). **Effect of Certain Physical Factors on the In Vitro Testing of Anthelmintics.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 131-133. 2 tables. [3 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 237. Signed C. L.]

In vitro tests of drugs against *Ascaris lumbricoides* show that a " liquid excess " of the drug is far more effective than a solid one.

If hexylresorcinol (or certain other drugs) is allowed to stand in contact with 1,000 parts of 0·9 per cent. sodium chloride solution at 37°C., a solid excess will remain. If the same mixture is heated and allowed to cool to 37 C. " the undissolved excess is a supercooled liquid ". The latter is far more rapidly lethal than the former to ascaris *in vitro*.

LAMSON, P. D., BROWN, H. W., & HARWOOD, P. D. (1934). **The Anthelmintic Properties of Certain Alkyl Phenols.**—*Amer. J. trop. Med.* **14.** 467-478. 3 tables, 5 charts. [13 refs.]

The authors attempted to find (a) some method of administering hexylresorcinol without causing irritation to the mucous membrane of the mouth, but which at the same time would allow the drug to reach the worms in an active form ; (b) to make esters and salts of hexylresorcinol which would be non-irritating to the mouth but split in the stomach and intestine and liberate hexylresorcinol, and (c) to find substances chemically related to hexylresorcinol which would be just as effective but be without the local irritant action.

They were unable to find any better way of giving the drug than in the form of sugar-coated pills. None of the esters which they tried gave any promise of being in any way superior to hexylresorcinol. Ortho-heptyl-phenol and hexyl-meta-cresol were found to have considerable anthelmintic properties and to be less irritating and less toxic than hexylresorcinol, but their efficiency did not come up to that of hexylresorcinol. The authors are hopeful that some substance will

ultimately be found among the very large number of these compounds which, although less active, may also be so much less irritating and less toxic than hexylresorcinol as to be taken in repeated doses without any need for the supervision of a physician.—E. L. TAYLOR.

POPESCU, F., & MIRONESCU, D. M. (1935). Cercetări experimentale pentru stabilirea proprietătii teniifuge, la câini, a produsului nemural. [**" Nemural " as a Taenifuge for Dogs**].—*Arhiva vet.* **26.** 216-224. [28 refs.] [Abst. from French summary].

About 21 per cent. of the dogs in Bucarest are infested with *Taenia*. The authors found that in 75 per cent. of cases a dose of one tablet of " nemural " per 5 kg. body weight, given after a fast of 12 to 24 hours, caused elimination of all the *Taenia* in about 15 minutes. Far better results were produced if the tablets were mixed in syrup than if they were administered in water or with meat.

WRIGHT, W. H. (1934). **The Present Status of Anthelmintic Medication for Gastrointestinal Parasites of the Horse.**—*J. Amer. vet. med. Ass.* **84.** 11-24. 2 tables. [14 refs.]

In the first part of the paper, under " Introduction ", " Method of Administration " and " Time of Treatment ", the material is of a general nature. Under contraindications for treatment, the actions and contraindications of the following drugs are dealt with :– carbon bisulphide, carbon tetrachloride, N-butylidene chloride, oil of chenopodium and tetrachlorethylene. Particulars are given of the results of the treatment of carbon tetrachloride intoxication by calcium gluconate and by parathyroid extract.

Under specific therapy the following is given :–

TAPEWORMS.—No evidence is available based on critical tests of drugs, but those used include turpentine, areca nut, kamala and male fern.

BOTS.—Liquid carbon bisulphide is the best treatment. Solid carbon bisulphide, in which the drug is adsorbed in magnesium carbonate, is less efficient. Carbon tetrachloride is not particularly effective. Tetrachlorethylene may be of value in cases where carbon bisulphide is contraindicated.

STOMACH WORMS.—Carbon bisulphide, preceded by gastric lavage using a 2 per cent. solution of sodium bicarbonate, is recommended. It is not, of course, possible to get rid by this means of *Habronema* in the nodules that are formed.

ASCARIDS.—Carbon bisulphide and also carbon tetrachloride have good results. Oil of chenopodium is of very limited value. N-butylidene chloride is probably effective.

STRONGYLES and CYLICOSTOMES.—Oil of chenopodium is very effective. Carbon tetrachloride gives good results for large strongyles, but is only 50 per cent. effective for small ones. N-butylidene chloride may be of value.

Oxyuris.—Oil of chenopodium and oil of turpentine are effective. N-butylidene chloride gives good results in only 50 per cent. of cases.—W. J. IRONSIDE.

YUTUC, L. M., & TUBANGUI, M. A. (1935). **The Treatment of Canine Ancylostomiasis with Hexylresorcinol.**—*Philipp. J. anim. Indust.* **2.** 193-198. 2 tables. [11 refs.]

Hexylresorcinol, in the form of chocolate-coated pills and in doses of 0·2 g. or 0·4 g., according to the size of the dog, was tried for the removal of hookworms from 27 dogs which were previously shown by faecal examination to be infected. The faecal counts in the untreated dogs varied between 800 and 276,000 per c.c. and averaged 39,390 per c.c. Judging by subsequent faecal examination the drug

was shown to have an efficiency of 91·75 to 96·98 per cent. Several dogs showing a negative faecal examination were found, however, on subsequent *post-mortem* examination to be carrying a few worms, suggesting that the drug may have had an inhibiting effect upon the egg production of female worms.—E. L. TAYLOR.

SCHEINER, A. (1935). Versuche zur Bekämpfung der Rinderräude. II. Beitrag. Derrispräparate (Panderran und Derrisol), Aulin. [**The Control of Cattle Mange. Derris Preparations and "Aulin"**].—*Inaug. Diss. Hanover.* pp. 39. 8 tables. [12 refs.]

164 cattle were treated with one or other of these preparations of derris root. Of these, 89 were cases of chorioptic mange and 75 of sarcoptic mange. The derris preparations successfully destroyed all parasites and brought about complete healing. Chorioptic mange was more amenable to treatment, two washings with a 3 per cent. solution of derris preparation effecting a cure, whereas such treatment had to be repeated frequently in the case of sarcoptic mange. A 10 per cent. solution is recommended for treatment of the latter condition. "Aulin", an organic preparation of tin, also proved satisfactory for the destruction of mites, but the fact that the preparation must be washed off with soap and water an hour after administration detracts from its usefulness.—E. J. PULLINGER.

TSCHEBOTOROW, R. S. (1935). Arsenigsaure Natriumlösung als Abtötungsmittel gegen Zecken Piroplasmen und Nuttalliosenüberträger bei Pferden. [**The Value of Sodium Arsenite in the Destruction of the Ticks Transmitting Equine Babesiasis**].—*Tierärztl. Rdsch.* **41.** 402-406. 3 tables.

The author argues that the treatment of equine piroplasmosis with trypan blue is not entirely satisfactory as it leaves carrier animals; he therefore undertook experiments to ascertain the value of sodium arsenite in the destruction of *Dermacentor marginatus*, *D. niveus* and *D. silvarum*, the ticks responsible for the transmission of equine piroplasms in Europe. Various concentrations of sodium arsenite in solution were applied to the skins of horses by swabbing four times at intervals of five days; the ticks were then applied in metal boxes, the results being judged by the number of ticks which were killed. A solution containing 0·23 per cent. of arsenious oxide destroyed 94 per cent. of the ticks, but caused symptoms of poisoning in the horses. A solution containing 0·21 per cent. of arsenious oxide was harmless to the horses but only killed 66·6 per cent. of the ticks. The same concentration in an emulsion, with soap and petroleum, destroyed 83·3 per cent. of the ticks if these were applied within 24 hours of the skin dressing. Each horse required 2 to 5 litres of the solution for one dressing. The lethal dose of arsenic for a tick was estimated at 0·006 mg. and it appeared that female ticks were more easily destroyed than males.—U. F. RICHARDSON.

VIOLLE, H. (1935). Action du ricinoléate sur divers microorganismes. [**Action of Ricinoleate on Various Micro-Organisms**].—*C. R. Acad. Sci., Paris.* **200.** 1152-1154. [1 ref.]

Sodium ricinoleate in a dilution of 1 : 1,000 killed the human and bovine types and also BCG strains of tubercle bacilli after 30 minutes at 37°C. *Mycobact. tuberculosis*, however, required a solution of 1 : 100 for 60 minutes before it became inactivated. It was found that, whilst streptococci were very sensitive to the action of sodium ricinoleate and staphylococci were resistant, the bacteriophages derived from both streptococci and staphylococci were equally insensitive to the prolonged action of this salt. The author found that it was impossible to retard the action of diastases by the presence of ricinoleates and suggests that this demonstrates an

analogy between diastases and bacteriophages. Since he also showed that viruses were very susceptible to the action of a ricinoleate, he concluded that there is a definite difference between a virus and bacteriophage. These results are of importance in determining the nature of bacteriophage.—JAMES STEWART.

STARK, O. K., & MONTGOMERY, Marjorie. (1935). **A Study of Bacteriostatic and Germicidal Powers of Merphenyl Nitrate.**—*J. Bact.* **29.** 6-7.

Merphenyl nitrate (basic) has a powerful inhibitory action on bacteria. By Kilmer's method, *Bact. coli* was inhibited by a 1 : 420,000 concentration, and *Staphylococcus aureus* by a 1 : 12,000,000 concentration. Owing to its high inhibitory powers, its germicidal powers are difficult to estimate accurately. The most satisfactory results were obtained by employing a given dilution of the chemical and varying the time element, using plate counts as well as broth tubes.
—A. BROWNLEE.

HOLZMAYER. (1935). Eine neuartige Therapie des bösartigen Katarrhalfiebers des Rindes. [**Treatment of Malignant Bovine Catarrh**].—*Münch. tierärztl. Wschr.* **86.** 258.

Case records of malignant catarrh in two young bovines which quickly responded to treatment with an intravenous injection of calcium and magnesium chloride.

It is stated that hypocalcaemia is common in the district in which the cases were observed.—J. E.

KERNKAMP, H. C. H. (1935). **Soil, Iron, Copper and Iron in the Prevention and Treatment of Anemia in Suckling Pigs.**—*J. Amer. vet. med. Ass.* **87.** 37-58. 7 charts. [9 refs.]

Anaemia in suckling pigs is an oligochromemia, with a slight oligocythemia, and can be produced by confining pigs to floored pens which are kept reasonably clean of soil and litter. When piglets ingest soil they are able to escape the anaemia and this seems to indicate that soil supplies the factor which prevents the disease.

Experiments were conducted to verify this fact, and it was found that 600 mg. of soil daily did not prevent the occurrence of anaemia and that as large amounts as 2,400 mg. of soil had to be ingested daily to prevent the disease. On account of its red blood cell regeneration properties, iron was selected as the most likely element in the soil which might prevent anaemia. Various experiments with copper-free iron solution showed beneficial results, which indicated that iron was probably the element required. Experiments using an iron and copper solution did not suggest that copper contributed much to the haemoglobin regeneration.

The paper contains seven instructive charts.—N. H. BROOKSBANK.

HUSTEDE. (1935). Die hormonbehandlung der Nachgeburtsverhaltung bei der Stute. [**The Hormonal Treatment of Retention of the Placenta in Mares**].—*Dtsch. tierärztl. Wschr.* **43.** 385-386.

The author records seven cases in which retention of the placenta by mares has been treated by means of pituitary extracts. "Hypophysin" or "orastin" was given intravenously in 6 c.c. doses about ten hours after parturition when there was no sign of the foetal membranes coming away. Both agents induced uterine contractions after a few minutes and in the mares dealt with the membranes were expelled after about an hour, no ill effects being observed afterwards. The author considers that there is no object in giving these preparations by the epidural

route and that it is a mistake to wait for a long time after parturition before treatment is begun. The chief indication for the use of pituitary preparations is a diminution in the force of the *post-partum* uterine contractions and they may be given any time after the sixth hour following parturition.—J. A. NICHOLSON.

BERNER. (1934). Diathermische Belastungsversuche an der Haut des Pferdes. [**Diathermic Experiments on the Skin of the Horse**].—*Z. Veterinärk.* **64.** 254-263 and 273-286. 6 figs. [10 refs.]

The use of heat in medicine is one of the oldest forms of treatment. The introduction of electricity has led to improved technique in its application. Diathermy is the use of high frequency current so that the latter passes to the body in a direct manner. The method of applying diathermy and the manner of preventing injurious results are described in great detail. With the author's apparatus, incorporating moist rubber sponges on electrodes, 1·8 amps. could be applied to the horse over the joints for half an hour for several consecutive days without injury to the skin. In human medicine, diathermy has many uses in the treatment of diseases of the circulatory apparatus, internal organs, joints, muscles, skin, ears, and eyes, and in the treatment of neuralgia and other nervous conditions. In veterinary science, JÖHRICKE has used it on nine dogs suffering from the nervous sequelae of distemper and has cured six. ECKERT claims good results in horses suffering from wounds, paralysis, bruises and atrophy. In cattle, dermatitis granulosa responds to it. Success is also claimed in the treatment of dogs and bitches suffering from eczema, alopecia symptomatica and catarrhal conditions of the genital apparatus, and also in the treatment of sheep and cats affected with the latter conditions.—A. W. N. PILLERS.

POISONS AND POISONING.

BATTAGLINO, G. (1935). Contributo allo studio dell'avvelenamento dei bovini per sale pastorizio. [**Poisoning of Cattle by Salt Pastures**].—*Nuovo Ercol.* **40.** 288-292. [8 refs.]

The author discusses the various opinions which have been held regarding the toxicity of sodium chloride and describes a typical case of salt poisoning in a cow which had been grazing on a salt marsh. The animal was found in the morning unable to rise, but recovered sufficiently to walk home. When examined some hours later, it showed intense thirst, staggering gait, dilated pupils, rapid pulse and muscular tremors. Recovery followed an injection of caffeine and an unlimited supply of fresh water which was drunk greedily. An analysis of the pasture showed that it contained 97·5 per cent. of sodium chloride.—J. A. NICHOLSON.

BUFFAGNI, V. (1935). Avvelenamente da cloruro di sodio in suini e bovini. [**Poisoning of Swine and Cattle by Common Salt**].—*Profilassi.* **8.** 53-54. [13 refs.] [English and French summaries : abst. from orig.]

In the first case of poisoning described by the author, a number of pigs which had received large quantities of brine mixed in their food became ill and five died. The symptoms were inappetence, inco-ordination of movement and severe diarrhoea. On *post-mortem* examination, gastro-enteritis, cystitis and nephritis were found and a diagnosis of salt poisoning was made. When the brine was withdrawn, the remaining animals recovered.

In the second case, a cow thought to be suffering from indigestion was given 1 kg. of sodium chloride. Shortly after this it became seriously ill and was killed.

Intense gastro-enteritis was found in this case also. The author gives the toxic dose of sodium chloride for pigs as 1 g. per kg. body weight and considers that cattle should not be given more than 60 g. per day.—J. A. NICHOLSON.

WAUTIÉ, A. (1935). Contribution à l'étude des accidents causés par le sel et la saumure chez le porc. **[Salt and Brine Poisoning in Swine]**.—*Ann. Méd. vét.* **80.** 253-261.

Three cases are recorded of poisoning by brine in pigs. Each animal was receiving 400 g. brine per day (representing 60 to 80 g. NaCl) for eight days. Symptoms were not observed until two days after the brine was stopped. The animals were down with legs stretched out stiffly, reflexes absent, and were totally blind, with obstinate constipation. A 5 per cent. solution of calcium gluconate was injected subcutaneously in various places, the three cases receiving 17, 20 and 13 g. respectively. The animals showed marked improvement and 15 days after were in perfect health. From his experience the author recommends the subcutaneous injection of 20 g. calcium gluconate for pigs of 30 kg. body weight and 45 to 50 g. for pigs of 120 kg. body weight.

Some experiments were carried out on NaCl poisoning in pigs. Salt was added to their diet, partly mixed with the meal and partly dissolved in the water with potatoes. Two pigs each received 50 g. salt per day for five days, 75 g. per day for five days and 100 g. per day for 12 days. No symptoms were observed apart from an increase in thirst. They then received 200 g. per day for eight days and then 250 g. per day for three days. At the end of this period the thirst was acute, the urine abundant and the faeces liquid. No symptoms were observed except those of enteritis. The animals did not seem to lose much weight, but no records were kept.

The author concludes from his experiments that poisoning by NaCl may be conditioned by the following considerations :– (1) mode of administration, whether in solid form, as a concentrated solution or a dilute solution ; (2) the amount of water available to the animals ; (3) the tolerance of the animal, and (4) the type of food being fed.

Poisoning by brine, however, may not be as simple as poisoning by NaCl. Besides NaCl, brine contains potassium nitrate, propylamine and trimethylamine.

Symptoms of poisoning by brine and NaCl certainly differ considerably, animals poisoned by brine being constipated and showing nervous symptoms, while those poisoned by NaCl show profuse diarrhoea and digestive symptoms.

—G. D. SHEARER.

BEATH, O. A., DRAIZE, J. H., & GILBERT, C. S. (1934). **Plants Poisonous to Livestock.**—*Bull. Wyo. agric. Exp. Sta.* No. 200. pp. 84. 56 figs. [7 refs.]

This bulletin is issued primarily for the instruction of farmers in Wyoming. It is divided into three parts, part one dealing with plants which elaborate the toxic principle themselves ; part two with plants which absorb the toxic principle from the soil, and part three with plants which may occasionally cause losses in animals. The publication is well-illustrated by photographs of the plants and of animals suffering from various forms of poisoning.

The space devoted to each plant is divided into several sections :– the varieties of the species, where it grows, when it appears, poisonous period, animals affected, symptoms, treatment and general remarks. The plants dealt with in part one are :– the larkspurs, water hemlock, lupins, death camas (*Zygadenus gramineus*), arrow grass (*Triglochin maritima*), white loco (*Oxytropis saximontana*), aconite and a lichen (*Parmelia molliuscula*).

Certain plants growing in the cretaceous shale beds in Wyoming are capable of absorbing toxic minerals from the soil, such as copper, arsenic, molybdenum, tin and, in particular, selenium. The presence of selenium in the plants is suspected of causing alkali disease and blind staggers (two very closely related diseases) in horses, sheep and cattle. Normally these shale beds have not been found to render forage and crops toxic, except where weeds, which have absorbed the selenium, have decayed, thus rendering the mineral more available for absorption by other plants. Alkali disease and blind staggers are chronic forms of poisoning and may take from a few months to several years to develop. The symptoms and *post-mortem* findings in the two diseases are briefly described [see this *Bull.* **5.** 854]. The treatment suggested is subcutaneous injection of strychnine sulphate and drenching with warm water. Various plants are then described which grow on these shale areas and are capable of absorbing toxic minerals from them. No figures are given for the amounts of selenium or molybdenum found in these plants.

The third part of the bulletin gives a short account of various plants which have been accused of causing losses in animals.—G. D. Shearer.

Altara, I. (1935). Osservazioni alla nota critica: "Il mal della ferula in Sardegna." [**Fennel Poisoning of Animals**].—*Clin. vet., Milano.* **58.** 407-413.

In reply to a previous paper on this subject [see this *Bull.* **5.** 526.], the author brings evidence to refute the suggestion that fennel is always poisonous to animals and claims that feeding experiments carried out by him show that the toxicity of the plant is affected by climatic and other conditions. He considers that the plant is especially dangerous after heavy rains, whereas in dry seasons it is practically harmless.—J. A. Nicholson.

Emmel, M. W., Sanders, D. A., & Henley, W. W. (1935). **Additional Observations on the Toxicity of Crotalaria spectabilis (Roth) for Swine.**—*J. Amer. vet. med. Ass.* **87.** 175-176. [2 refs.]

The authors find that swine under field conditions are more likely to be poisoned by the green foliage than by the seeds of *C. spectabilis* [see this *Bull.* **5.** 456]. Swine will eat it more readily in the late summer, as it remains green when most of the other green food has dried off.—G. D. Shearer.

Becker, R. B., Neal, W. M., Arnold, P. T. D., & Shealy, A. L. (1935). **A Study of the Palatability and Possible Toxicity of 11 Species of Crotalaria, especially of C. spectabilis Roth.**—*J. agric. Res.* **50.** 911-922. 7 figs., 3 tables. [10 refs.]

Grazing and feeding trials were carried out on 11 species of *Crotalaria*, and *C. spectabilis* Roth was proved to be capable of producing both an acute and a chronic form of poisoning in cattle. Clinical and *post-mortem* findings are recorded in three cases of chronic and one of acute poisoning. The other species were found to be non-toxic to cattle.—G. D. Shearer.

Coleman, F. F. (1934). **Poisonous Properties of Sudan and Other Sorghums.**—*Rep. Dep. Agric. Qd. 1933-1934.* pp. 144-147. 6 tables.

A comprehensive series of analyses for hydrocyanic acid [cyanogenetic glucoside] have been carried out on several species of *Sorghum* at various stages of growth. In all species the HCN content decreased as the plants matured. Sudan grass (*S. sudanese*) contained less than sweet sorghum (*S. vulgare*) while

Johnson grass (*S. halepense*) and a native sorghum (*S. verticilliflorum*) had a very high content, even greater than sweet sorghum. The analyses are set out in tables.
—W. I. B. Beveridge.

Tarantino, G. B. (1935). Avvelenamento alimentare : Potere tossico delle piante giovani di Dura. **[Toxicity of Young Sorghum]**.—*Clin. vet., Milano.* **58.** 66-73.

The author records a number of deaths amongst horses from the ingestion of dried sorghum plants. Experiments were carried out to determine the variations in toxicity of the plant, for it had been noticed that Somali natives regularly suck the stems of full grown plants. One horse, two oxen and two goats were given a diet consisting solely of sorghum which had been growing for 30 days. On the fourth day of feeding, the horse and oxen became ill and died unexpectedly in a short time. On *post-mortem* examination, marked congestion and oedema of the lungs were observed but otherwise there were no gross lesions. The two goats remained healthy. Sorghum plants 60 to 70 days old were then fed to cattle, horses, camels, mules, etc. but no ill effects were produced. Chemical examinations showed that plants from both irrigated and non-irrigated areas contain a cyanogenetic glucoside for the first two months of their life ; the HCN content, however, gradually diminishes as the plants get older.—J. A. Nicholson.

Busso, L. (1934). Contributo alla conoscenza delle piante cianogenetiche. Avvelenamento da *Sorgo gentile* nei bovini. **[Cyanogenetic Plants. *Sorghum gentile* Poisoning in Cattle]**.—*Boll. Ist. Zooprofil. Sper., Turin.* March. pp. 34-46.

Recent work has shown that the cyanogenetic compounds present in certain plants are probably the first stage in the formation of proteins. They occur in plants at the points of greatest metabolic activity and their formation is influenced by such factors as light, soil conditions, moisture, etc. Small changes in the normal metabolism of a plant may influence its hydrocyanic acid content.

Varieties of sorghum have recently been grown in Italy for cattle fodder and the author records several cases of poisoning. These plants contain a cyanogenetic glucoside and an enzyme which together produce dangerous amounts of prussic acid under certain conditions. In one case, two animals died and several others became ill after they had received a diet consisting solely of *S. gentile*. The symptoms were identical with those of hydrocyanic acid poisoning but no chemical tests were made to confirm the presence of this substance. Young sorghum plants or those grown under unsuitable climatic conditions or on land which has been heavily manured with nitrates are likely to be dangerous. Any plant which contains more than 0·02 per cent. of HCN is capable of poisoning animals.
—J. A. Nicholson.

Lynch, J. (1935). **Bracken Poisoning.**—*Vet. Rec.* **15.** 1067-1068.

Seven cross-bred Hereford cattle, never allowed out to grass, were found ill with high temperatures ranging from 106·2° to 107°F. One animal was very ill, off its food, its breathing hurried and stertorous but not laboured and there was slight oedema of the throat. On enquiry it was found that the animals had been bedded on bracken for the previous six weeks and that they had eaten freely of it. Two days later, one animal died with marked emphysematous swelling of the throat and neck. Autopsy revealed gelatinous infiltration of the throat and jugular furrow with a considerable amount of gas formation. Bracken stems were found in the rumen contents. No petechiae or blood stains were seen anywhere. Only two of the seven animals were alive at the end of the week.—G. D. Shearer.

FRANKE, K. W. (1934). **A New Toxicant Occurring Naturally in Certain Samples of Plant Foodstuffs. I. Results Obtained in Preliminary Feeding Trials. II. The Occurrence of the Toxicant in the Protein Fraction.**—*J. Nutrit.* **8.** 597-608 and 609-613. 4 text figs., 2 figs. on 1 plate, 6 charts. [9 refs.]

FRANKE, K. W., & POTTER, van R. (1934). **A New Toxicant Occurring Naturally in Certain Samples of Plant Foodstuffs. III. Hemoglobin Levels Observed in White Rats which were fed Toxic Wheat.**—*Ibid.* 615-624. 3 figs. [8 refs.]

[Copied *verbatim* from *Nutr. Abstr. Rev.* **4.** 937. Signed W. W. SNEDDEN].

1. The symptoms and pathology of a new nutritional disturbance associated with plant materials from certain definite areas are described. A definite toxic compound is suspected but this has not yet been identified. This toxic principle has been found in corn, wheat, barley and emmer from the affected areas, and in experiments carried out with rats 299 out of 325 died within 100 days.

2. Various extracts of wheat and corn were fed to rats, and it was shown that most of the toxic principle is contained in the protein fraction of the grains.

3. Of 19 animals fed on an otherwise adequate diet containing toxic wheat, all died or were sacrificed by the 73rd experimental day, 6 with no decrease in haemoglobin level and 13 with values ranging from 2·0 to 10·8 g. per 100 ml. blood (decrease extending over 14–34 days). Comparison with controls on normal wheat showed that the anaemia observed was not due to inanition.

PHYSIOLOGY.

HOWELL, W. H. (1935). **Theories of Blood Coagulation.**—*Physiol. Rev.* **15.** 435-470. [108 refs.]

Very many workers have attempted to unravel the chemical and physical mechanisms responsible for the clotting property of blood, but the process has proved to be an intricate one involving a number of different factors. While much progress has been made in determining the nature of these factors and the way in which they interact to produce the final result, the complete story is still unknown, and a wide divergence of opinion among special workers on the subject with regard to the interpretation of the known facts still exists, since no one theory has been so demonstrably adequate as to meet with general acceptance. This review of the many theories advanced is by one who has done much to simplify the complications which surround the subject and his own theory, which is outlined below, is typical of the modern point of view in respect of the clotting mechanism of blood.

The author has put forward a theory which concerns an inhibitory substance in the circulating blood which prevents coagulation. This inhibitory substance is heparin. In the circulating blood, Howell suggests that it combines with prothrombin to form a prothrombin-antiprothrombin complex. When the blood is shed the tissue factor liberated from the platelets, which he believes to be a cephalin compound, combines with the heparin and sets free the prothrombin. The prothrombin is then activated by the calcium of the blood to thrombin which in its turn reacts with fibrinogen to form fibrin. Readers will observe that this theory does not gain universal acceptance, but it adequately covers the fundamentals of the two phases into which the majority of workers divide the coagulation of blood, namely, the formation of thrombin from its precursors and the conversion of fibrinogen to fibrin, as well as giving a possible theory of the mechanism whereby thrombin may be formed from its precursors.

The trend of modern work tends to support the view that the active chemical

constituent in tissue extracts is a phospholipin of the nature of cephalin, rather than lecithin, and there is perhaps increasing recognition of the fact that an inhibitory or protective factor of the nature of heparin may be concerned in maintaining the normal fluidity of the blood, but in regard to the details of the formation of thrombin and the nature of its reaction with fibrinogen there is still a wide and apparently constantly increasing divergence of opinion. A common basis still has to be found on which the many theories can be reconciled. Those interested in the subject will find this well-written review with its bibliography a great help in fully grasping the difficulties of the subject, as well as enabling them to ascertain the present conceptions of the mechanism of that remarkable phenomenon, the clotting of blood.—James Stewart.

I. Palmer, E. Irene, & Biely, J. (1935). **Studies of Total Erythrocyte and Leucocyte Counts of Fowls. I. Repeated Erythrocyte and Leucocyte Counts.**—*Folia haemat.* **53.** 143-154. 6 tables. [9 refs.] [In English].

II. Palmer, E. Irene, & Biely, J. (1935). **Studies of Total Erythrocyte and Leukocyte Counts of Fowls. II. Effect of 48-Hour Starvation on Total Erythrocyte and Leukocyte Counts.**—*J. Amer. vet. med. Ass.* **86.** 594-596. 3 tables. [3 refs.]

I. A systematic study of the blood of the fowl has not yet been attempted. Leucocyte counting has been hampered by the character of the thrombocytes and the presence of the bare nuclei of the erythrocytes.

The authors have adopted Shaw's technique which permits differential staining between the leucocytes and thrombocytes while preserving the erythrocytes.

In the first experiment, to estimate the amount of variation in several determinations on the same sample of blood, counts were made at intervals of one-half to four hours, from four birds, and the results indicated that the technique adopted should ensure accurate results.

The second experiment consisted of duplicate blood counts on 50 birds, the object being to determine the variation, if any, in the total red and white blood cell counts on birds taken at intervals of one minute to several hours.

The third experiment was designed to determine the variation, if any, in the counts on birds that were estimated once each day for four or five successive days. Twelve birds were used. Six birds were used in the fourth experiment to determine the variation in the total red and white cell counts on birds made four to seven times during one day.

Statistical calculations are submitted on the third and fourth experiments. Their important conclusion is that counts of individual birds fluctuated around a certain level characteristic of the individual.

II. The association of paralysis with starvation suggested this investigation. Blood for counting was obtained immediately before starvation, and after starvation had proceeded for 48 hours. Data were obtained from 39 birds.

On the 20 birds in group I counts were made once previous to and once following starvation for 48 hours. On group II, consisting of 14 birds, duplicate counts were made in each instance. On the five birds in group III four counts were made on successive days prior to starvation, an average being taken. The usual counts were made after starvation. A mash of feed and water was then given and a further count made 24 hours later.

In each group a definite decrease in leucocytes occurred in all except one bird. In 31 out of 39 birds an increase in erythrocytes was recorded. After the food was given in the last group, the count returned to the normal average.

A similar diminution in the number of leucocytes has been shown by various other authors to occur in dogs, rabbits and pigs after fasting.

The authors suggest that a standard procedure is necessary with regard to time of feeding and making counts in the study of normal or diseased fowls.
—F. H. Manley.

Krupski, A., & Almasy, F. (1934). Erythrocytenmobilisation beim Pferd. [**Mobilization of Erythrocytes in the Horse**].—*Verh. schweiz. naturf. Ges. 1934.* pp. 420-422. [2 refs.]

A report of the finding of a great rise in the red blood cell count of a thoroughbred mare caused by one and a half hour's strenuous exercise. The blood picture immediately before and after exercise was examined and it was found that an increase in the R.B.C. count of 40 per cent. (9·7 to 13·5 million) had occurred.

The same thing happens when such exercise is given to horses affected with infectious anaemia, but not those affected with anaemia of parasitic origin. Caffeine and adrenalin have no great influence on the blood count, but in one case a large dose of cocaine increased the cell count.—J. E.

Gomez, A. K., & Kesavan, T. R. (1935). **Studies on Haemopoietin, I.**—*Philipp. J. anim. Indust.* **2.** 79-102. 12 tables, 12 graphs. [4 refs.]

Twenty-four to 48 hours after removing one litre of blood from the jugular vein of a horse the authors were able to demonstrate, in a further sample, the presence of a substance capable of producing a marked increase in the number of erythrocytes in the blood stream of rabbits several days after injection.

Whereas the whole blood from unbled horses produced only a transitory effect, lasting several days, the effect of haemopoietic serum could be detected one or more weeks after injection, according to the dose given and the route of injection.

The constitution of haemopoietin is discussed, but at the present time it is only possible to make conjectures as to its real nature.—N. S. Barron.

Brion, M. A. (1935). Observations cliniques et expérimentales sur les épanchements chyleux et chyliformes des carnivores domestiques. [**Clinical and Experimental Observations on the Flow of Chyle**].—*Rec. Méd. vét.* **111.** 321-334. [32 refs.]

Many observers have reported the withdrawal of milky fluids from the pleural and peritoneal cavities. Sometimes these are frankly purulent discharges; occasionally they appear to be of the nature of chyle. Examination of the latter type of pleural effusions in dogs showed them to contain *inter alia* 0·1 to 0·5 per cent. of fats and about 4 per cent. of proteids, including albumin, globulin, polypeptides and amino acids. The chyloperitoneal fluid from a cat contained 4·3 per cent. of fat and 3·5 per cent. of proteids, none of which were of a lower order than proteoses. Experiments were undertaken to elucidate the genesis of these chylous fluids. The cat was found to be the more satisfactory animal. Six cats were fed for several days on a diet rich in fat. The abdomen was opened and the lymphatics in the mesentery were divided. No effusion occurred after the operation and the animals made an uneventful recovery. From two to four weeks later the animals were killed, and it was found that the mesentery had healed. It was concluded that to produce a chylous effusion it would be necessary to rupture a large abdominal lymphatic trunk. From the examination of another case which occurred spontaneously in a cat, details of which are given, it is inferred that the cause of this condition is an abnormal fragility in the walls of the lymphatic vessels.—H. D.

KOUDRIAWCEFF, A. A., & KOUDRIACHEFF, M. V. (1935). **Basal Metabolism of Horses during Rest.**—*Sovyet. Vet.* No. 2. pp. 41-44. 1 table. [Abst. from French summary].

This paper is based on a study of the oxygen exchange made by the horse in the course of normal respiration, which the authors find to be a simple and valuable method of estimating energy expenditure. The volume of each respiration, the amount expired per minute and the number of respirations made per minute, were found to vary in individual horses according to the capacity of the lungs and the power to absorb oxygen. The respiratory coefficient is constant, however, in any single animal when observations are made under fixed conditions at the same hour daily. The authors consider that these indications provide a means of estimating the value of a working animal.—C. DAVENPORT.

CHOKHOR, N. I. (1935). **The Influence of Exercise Immediately after Food on the Digestion of the Horse.**—*Sovyet. Vet.* No. 2. pp. 45-47. 3 tables. [1 ref.] [Abst. from French summary].

The author finds that exercise brings about an increase in peristalsis in the anterior portion of the bowel, leading to overloading of the posterior parts. Exercise thus modifies the allocation of work throughout the digestive system. He points out that the principle of " rest after feeding " is thus justified on physiological grounds. The duration of the period of rest which ought to be allowed calls for special research.—C. DAVENPORT.

DYEKJAER, E. (1935). En kemisk hormonal Svangerskabsreaktion hos Hoppen. [**A Chemico-Hormonal Pregnancy Test for Mares**].—*Maanedsskr. Dyrlaeg.* **46.** 637-640. [1 ref.]

The author describes the method of Cuboni which demonstrates the folliculin-hormone in urine by means of a sulphuric acid test. In 1934 he examined many mares with good results. The method seems to be a good supplement to the biological demonstration of prolan. The folliculin cannot be demonstrated before the 110th day of pregnancy.—H. C. BENDIXEN (COPENHAGEN).

CALLOW, R. K., & DEANESLY, R. (1935). **Biological Activity of Derivatives of the Male Hormone Androsterone.**—*Lancet.* **229.** 77-78. 1 fig., 1 table. [6 refs.]

Following earlier work, two derivatives of androsterone have been tested on rats in an attempt to reach a conclusion as to whether androsterone is the actual testis hormone. " Andradiol ", a reduction product, was found to produce normal growth of the seminal vesicles and prostate glands of castrated rats. However, its low activity per capon unit did not permit of the assumption that it is a similar substance to that present in testis extracts. Androsterone benzoate was found to be comparatively inactive, probably due to the fact that it is hydrolysed very slowly in the body.—J. A. NICHOLSON.

KORENCHEVSKY, V., & DENNISON, Marjorie. (1935). **The Assay of Crystalline Male Sexual Hormone (Androsterone).**—*Bio-chem. J.* **29.** 1720-1731. 4 figs., 8 tables. [12 refs.]

The authors assayed a sample of pure crystalline androsterone dissolved in olive oil, by means of injections into 74 castrated male rats. The actual increase in weight of the seminal vesicles of these animals was found to agree closely with the theoretical increase in weight calculated per unit of body weight. The variation in the percentage increase in weight of the seminal vesicles from different litters

of rats which had received the same dose of the hormone was greater with androsterone than with urine preparations. The statistical examination of the results suggests that 150 or 200γ should be considered as one international unit of androsterone, this figure being suitable for the assay by the capon or by the rat method. The authors consider that the probable error of the rat unit of androsterone is less than ± 5 per cent.—J. A. NICHOLSON.

MARRIAN, G. F., & BEALL, D. (1935). **The Constitution of Equol.**—*Bio-chem. J.* **29.** 1586-1589. [6 refs.]

The authors have found that equol can be crystallized from the ether-soluble phenolic fraction of the toluene extract of pregnant mares' urine by means of chloroform. Large amounts have also been obtained from the urine of non-pregnant mares and stallions so that its presence in the urine is unconnected with the presence of oestrogenic hormones. The substance apparently disappears from the urine in winter, but no explanation for this phenomenon is as yet forthcoming. From a study of the products of fusion of equol with potassium hydroxide, the authors consider it to be a chromane or coumarane compound.—J. A. NICHOLSON.

CASIDA, L. E., CHAPMAN, A. B., & RUPEL, I. W. (1935). **Ovarian Development in Calves.**—*J. agric. Res.* **50.** 953-960. 6 tables. [6 refs.]

The authors have studied the degree of follicular development in the ovaries of 273 calves varying in age between two days and approximately 14 weeks. The weight, size and number of follicles in each ovary were recorded together with the external diameter of one uterine horn. Follicles were present in practically every ovary examined, which suggests that there is a gonad stimulating activity on the part of the anterior pituitary long before puberty. A careful study of the diameters of the follicles showed that progressive ovarian development takes place throughout early life and that there is a significant association between the diameter of the uterine horn and the activity of the ovary, judging by the appearance of the follicles. A comparison between the right and left ovaries of the same individual showed that the right ovary is usually more developed than the left. The large follicles present in the ovaries of young calves do not persist until puberty, but it could not be determined if periodic waves of follicular growth occur. It was evident, however, that individual follicles develop and regress independently of other follicles in the same animal.—J. A. NICHOLSON.

HOPKINS, J. W., & BIELY, J. (1935). **Variation in Weight of Some Internal Organs of the Domestic Fowl** (*Gallus gallus*).—*Canad. J. Res.* **12.** 651-656. 1 fig., 2 tables. [5 refs.]

The report covers the *post-mortem* examination of 100 apparently healthy single comb White Leghorn hens.

The live weight of the fowls varied from 1,200 to 2,175 g. The average weight of the liver, kidneys and spleen constituted 1·89, 0·64 and 0·12 per cent. of the average total live weight. Single organs, particularly the spleen, were relatively more variable than the total body weight.

The weights of the organs from individuals of similar live weight varied considerably but, on the whole, the larger birds had somewhat larger organs. As the size of the bird increased, however, the average percentage of the total weight due to liver, kidneys or spleen decreased.—NORMAN DOBSON.

DU TOIT, P. J., MALAN, A. I., GROENEWALD, J. W., & BOTHA, M. L. (1935). **Studies in Mineral Metabolism. XXXII. The Effect of Different Forms**

of Sulphur in the Diet upon the Growth and Wool Production of Sheep. —*Onderstepoort J. vet. Sci.* **4.** 229-239. 4 figs., 4 tables. [10 refs.] [For absts. of previous articles of this series, see this *Bull.* **5.** 667].

Six groups of sheep were fed on a basal ration, five of them with sulphur supplements in different forms. Group 1 received a supplement of cystine daily; group 2, a mixture of K_2SO_4, $MgSO_4$ and $CaSO_4$; group 3, a mixture containing altogether 0·36 g. of K.C.N.S.; group 4, sulphur (5 g. daily); group 5, sulphur (0·12 g. daily) and group 6, no supplement. Several sheep died during the experiment, three from urinary calculi, but these could not be attributed to the sulphur. No significant effects of these supplements could be observed in the sheep after 12 months. The supplement of cystine had no effect on the quantity of wool produced.—E. M. Robinson.

Elvehjem, C. A. (1935). **The Biological Significance of Copper and its Relation to Iron Metabolism.**—*Physiol. Rev.* **15.** 471-507. 1 table. [Numerous refs.]

The realization of the importance of copper in biological activities is comparatively recent, but its value in haemoglobin formation, emphasized by many workers, has opened up new vistas as to its usefulness in plant and animal life. This article opens with a historical review of the subject from the year 1817, when it was first noted as a constituent of plants. It deals with the role of copper in marine animals, higher animals, foods, plants and micro-organisms. It reviews our knowledge of its usefulness in the treatment of anaemia, and finishes with a section on the mechanism of copper activity. It is shown that copper is present in all living matter, but that its amount varies greatly in different organisms as well as in different tissues of the same organism. Two naturally occurring copper compounds are known, haemocyanin and turacin. Copper is necessary as a supplement for haemoglobin formation in red-blooded animals, but its usefulness is in the actual formation of the haemoglobin and not as an aid to the assimilation of iron. A varied diet usually supplies a sufficiency of copper, though several foodstuffs, including milk, are deficient in this element. Therapeutic doses of simple inorganic copper salts with iron salts will allow adequate haemoglobin formation. Copper has been found to be essential for plant growth, but its function, apart from chlorophyll formation, is unknown. Recent work concerning the mechanism of copper activity in the body deals mainly with the distribution of copper in different tissues, changes in the copper content of blood, the effect of copper on iron storage and utilization, and its relation to certain enzyme systems.—James Stewart.

Riddell, W. H., Hughes, J. S., & Fitch, J. B. (1934). **The Relation of Phosphorus Deficiency to the Utilization of Feed in Dairy Cattle.**—*Tech. Bull. Kans. agric. Exp. Sta.* No. 36. pp. 54. 6 figs., 16 tables, 2 charts. [43 refs.]

It has been reported by several authors that a shortage of phosphorus in a ration is a limiting factor in the economical utilization of the ration. In this paper the utilization of foodstuffs by dairy cows which were on a low phosphorus ration was determined by studying the coefficients of digestibility and the metabolizable energy of the ration and also the energy metabolism of the cows. One cow was used as control throughout the experiment, while for each phase of the experiment two different cows were put upon a phosphorus-deficient ration which consisted of hay, beet pulp, molasses, blood-flour, corn and oats, and which contained approximately 0·57 per cent. calcium and 0·12 per cent. phosphorus. The control cow received a phosphorus supplement of 100 g. of monosodium phosphate, which raised the phosphorus content of its ration to 0·34 per cent.

It was found that phosphorus deficiency *per se* did not depress the digestive

functions of the animal, since the lactating cows in a condition of aphosphorosis were found to digest their food as completely as the normal control. No abnormal loss of energy could be demonstrated in the excretion of the phosphorus-deficient animals, but the oxygen consumption measurements, made by means of a portable metabolism apparatus, indicated a slightly higher energy metabolism for the animals in the phosphorus-deficient condition. Heavy losses of weight occurred in the case of all the phosphorus-deficient animals, but this could not be attributed to failure of appetite, which also eventually appeared, as the loss of weight invariably occurred while the cows were consuming sufficient nutrients to allow for a gain in weight. Addition of a phosphorus supplement immediately restored appetite and a gain in weight followed. Phosphorus deficiency did not prove a limiting factor in milk production, but the cows in the present experiment showed a marked inhibition of oestrum, a condition reported by other authors in phosphorus-deficient animals. The inorganic phosphorus content of the blood of the phosphorus-deficient cows fell to less than 1 mg. per 100 c.c. of whole blood in the course of the experiment, but the plasma calcium content remained normal. As the authors themselves point out, the small number of animals used in each phase of the above experiments renders it necessary that the experiments should be repeated on a greater number of cows before complete acceptance of these findings can be considered.—JAMES STEWART.

TECHNIQUE.

KARSTEN. (1935). Ueber einen zur Bangbakterienzüchtung eingerichteten Brutschrank. [**An Incubator Suitable for Culture of** *Brucella abortus*].—*Dtsch. tierärztl. Wschr.* **43.** 71-73. 2 figs. [6 refs.]

Karsten illustrates and gives details of an incubator consisting of two gas-tight chambers, used for the cultivation of *Br. abortus* in an atmosphere containing carbon dioxide. Gas-tightness is obtained by rubber washers on the outer doors, and the carbon dioxide is supplied *via* a tap to each chamber from a gasometer of known volume, the air passing out by other taps at the top. A point to which the author draws attention, and which may not be generally known, is that the carbon dioxide content of the ordinary gas supplied for lighting and heating may vary from 1 or 2 to 8 per cent.—A. W. STABLEFORTH.

HIMMELWEIT, F. (1934). **New Microsurgical Methods and their Use in the Study of Infection and Immunity, as Demonstrated by Tissue Cultures Infected with Spirochaeta gallinarum.**—*Arch. exp. Zellforsch.* **15.** 452-453. [1 ref.] [In English].

By means of a dissection device fitted into the substage of the microscope instead of the usual illuminating apparatus (the place of which is taken by an Ultropak illuminator) it is possible to study infective and immunological processes in living cells growing isolated on areas free from plasma, and to work on objects of considerable thickness. In studying the interaction between the tissue cells and *Spirochaeta gallinarum* by means of this apparatus, it has been noted that the macrophages do not exhibit true phagocytosis, but are themselves penetrated by the spirochaetes, which are activated by antibodies in immune serum, called by the author " spirochaetotropins ".—NORMAN BISSET.

ALLISBAUGH, H. C., & HYDE, R. R. (1935). **Fractional Ultrafiltration.**—*Amer. J. Hyg.* **21.** 64-93. 18 tables, 4 graphs. [18 refs.]

A method of preparing acetic acid collodion membranes with a wide range of permeability is described. In addition, details are given of an apparatus, suitable for the assembly of the discs, fitted with a very simple type of metal holder equipped with calibrated metal discs. A rotating collecting chamber has also been evolved which considerably facilitates experiments on fractional filtration. The details should be consulted in the original.—R. E. GLOVER.

HUDSON, C. L., & MUDD, S. (1935). **An Ultramicro Technic for Precipitation and Agglutination Reactions.**—*J. Immunol.* **28.** 311-320. 3 tables. [3 refs.]

A capillary tube technique is described for carrying out precipitation and agglutination experiments. The results are observed through a binocular microscope. Advantages claimed for the method are the minute amount of material used and the rapidity with which results can be read. Comparative macroscopic tests showed the reliability of the method.—R. LOVELL.

OLSON, C., Jr. (1935). **Available Methods for Examination of the Blood of the Fowl.**—*J. Amer. vet. med. Ass.* **86.** 474-487. 3 figs., 4 tables. [17 refs.]

The available methods for examining the blood of the fowl are discussed. Comparative studies were carried out, counts from the same blood being made by the different methods, including those of Blain, Shaw, Forkner and Wiseman and that utilizing Toisson's solution. The method of testing the accuracy is given in detail. The chicks used were apparently normal and the blood was obtained by puncturing the wing vein. The Wiseman technique appeared to be most consistent for erythrocyte counts, and the Blain and Toisson's solution for leucocyte counts, whilst for the combined counts the Blain method was preferable. The Wiseman method tended to give high results, but no satisfactory explanation for this could be found. The methods commonly used for the estimation of haemoglobin are discussed and a comparative study carried out. The Newcomer and photo-electric haemoglobinometer gave consistent though different results, and a conversion equation was calculated.—J. E. WILSON.

REYNIERS, J. A. (1935). **Mechanising the Viable Count.**—*J. Path. Bact.* **40.** 437-454. 8 text figs., 1 plate, 3 tables. [7 refs.]

This is a description aided by diagrams of a somewhat complicated piece of apparatus devised in order to reduce to a minimum the numerical deviation encountered in " bacterial counts ". The purpose of the apparatus is to distribute bacteria evenly in one plane in a definite pattern on an agar surface. The technique has been mechanized as far as possible, and it is referred to for purposes of convenience as the R method.

Comparisons between this R method, the standard agar method and Wilson's roll tube method show that with the former a much greater degree of standardization is possible, that the numerical deviation is less, and that the method is easier to use and permits considerable saving of time.

For a description of the apparatus readers should consult the original publication.—GWILYM O. DAVIES.

MISCELLANEOUS.

CYPRUS. (1935). **Order made under the Contagious Diseases (Animals) Law 1880. [Importation of Dogs Order, 1935].** pp. 2. Nicosia : Govt. Printer. [fcp].

By this order no dog may be admitted into Cyprus without a permit in writing from a veterinary officer or a port medical officer. Dogs when admitted will be

subject to quarantine for six months, or, in the case of dogs imported from countries in which the incidence of rabies is high, for nine months. Only the ports of Famagusta, Larnaca or Limassol may be used. All dogs must be accompanied by a veterinary certificate from the country of origin, indicating breed, age, sex, markings, state of health and time during which it has been in the country of origin prior to exportation. Provision is also made for the destruction of rabid dogs. In-contacts may be destroyed or, at the discretion of the Director of Agriculture, isolated for a further period.—F. BULLOCK.

—. (1935). I medhold av foranstående Stortingsmeddelelse fremsatte så Landbruksdepartementet under 13 mars 1935 fölgende forslag til Stortinget om bemyndigelse til å sette i gang et plasmessig arbeid for undersökelse og bekjempelse av forskjellige meget tapbringende husdyrsykdommer. [**Norway : Parliamentary Discussion on Control of Animal Diseases**].—*Norsk VetTidsskr.* **47.** 277-282.

In a proposition to the Government in which there was a discussion on the principles and steps which ought to be taken officially in order to improve the conditions of the farming industry in Norway, the Ministry of Agriculture stressed the opportunity yielded by the present low prices for doing more as regards the improvement of the stock, especially by eliminating low-grade and sick animals from the herds. Work on eradication of tuberculosis and contagious abortion in cattle has already been undertaken, but there are many other ailments which annually cause heavy losses to stockowners.

SLAGSVOLD, in a report added to the proposal, pointed out diseases in sheep and goats, parasitic diseases in all species, poisoning, diseases due to bad pastures and, most important of all, deficiency diseases and mastitis and sterility in cattle. He states that our knowledge of these is incomplete and that, therefore, more research work should be undertaken to help in their control. The Veterinary Director supported this view and emphasized the importance of systematic work now being started on these questions, to the extent that grants by the Ministry would allow it. On application, authority was given, without dissension, to the Ministry to start research work gradually on these lines and to engage competent scientists to carry them out.—GUSTAV NAERLAND (FARSUND).

PAVLOW, G. (1935). La réglementation du trafic frontière. [**Regulation of Frontier Traffic in Animals and Animal Products**].—*Bull. Off. internat. Epiz.* **10.** 303-316. Discussion pp. 378-379. 5 maps. [1 ref.]

The study of epidemiology establishes the fact that foot and mouth disease, sheep pox, rabies and swine plague defy all frontier police regulations. Dourine and glanders cross the frontier by smuggling ; rinderpest and contagious pleuropneumonia, on the other hand, can be kept out by ordinary police measures.

The transmission of epizootic diseases across land frontiers is a matter for general international agreements. The arrangements at present in force are not, however, efficient. Outbreaks still occur which paralyse the efforts of one country to extinguish certain diseases and to lessen the frequency of others. The Office international des Epizooties should, therefore, establish a commission to study questions relative to the unification of veterinary services in frontier zones as well as the question of the unification of measures for combating epizootic diseases in such zones.—F. BULLOCK.

—. (1934). Dansk veterinaerhistorisk Aarbog. [**Danish Veterinary-Historical Year Book. First Year**]. pp. 188. Numerous photographs. Skive : Holms Bogtrykkeri. [8vo].

This is the first publication of the Danish Veterinary Historical Society which came into existence in 1934.

It contains 12 articles dealing with biographies of prominent Danish veterinarians of bygone days and other closely related matters, including an account of an outbreak of foot and mouth disease in Jylland in 1790.

This first annual volume is very well printed and contains many illustrations.

—J. E.

OFFICIAL AND OTHER REPORTS.

DU TOIT, P. J. (1934). **Safeguarding Stockfarming in the Union. Annual Report of the Division of Veterinary Services and Animal Industry.**—*Fmg S. Afr.* **9.** 530-538. 6 tables.

A review is given of the general position as regards the occurrence of stock diseases in the Union. The most interesting features are the complete absence of foot and mouth disease after the outbreaks of the previous year, and the severe outbreaks of swine fever, particularly the one affecting the Western Province. The disease was not swine fever as seen in Europe and America, but that described as African virus disease of pigs for which a new name has been suggested, i.e. African swine fever. The greater part of the report is devoted to the work done at Onderstepoort. The most noteworthy features are the promising results from the issue of the neurotropic virus vaccine for horse-sickness and the method of treating intestinal worms, particularly the nodular worm, with drugs administered after the oesophageal groove has been made to close. Much valuable toxicological work was done during the year and some interesting bowel resections on dogs and sheep were made in the physiological department, to study the effect on nutrition. The studies on mineral metabolism have been continued and have given valuable information.—E. M. ROBINSON.

UNITED STATES OF AMERICA, COLORADO. (1934). **Report of the Division of Pathology and Bacteriology, Colorado Agricultural Experiment Station, for 1933-34.** [NEWSOM, I. E.]—*47th Rep. Colo. agric. Exp. Sta. 1933-34.* pp. 25-27.

" SOREMOUTH " OF SHEEP.—Immunization has proved to be of great value in lowering the mortality of this virus disease from 20 to less than 1 per cent. [see this *Bull.* **4.** 733].

COCCIDIOSIS IN SHEEP.—In 1933 six outbreaks involving ten thousand lambs were observed, in which 10 per cent. became affected and 3·2 per cent. died. Tests have shown that the coccidia remain viable for several months if kept moist.

" DEATH LOSSES ON HEAVY GRAIN FEED ".—Research into the toxicity of intestinal filtrates of affected lambs for sheep and guinea pigs were partly positive in result, but insufficient proof has been obtained that the condition is an enterotoxaemia.

BOVINE CONTAGIOUS ABORTION.—A project for its control in range herds is being developed.

SWINE ERYSIPELAS.—Several outbreaks were noticed.

PHOSPHORUS DEFICIENCY.—The soil of the northern part of Craig county is thought to be deficient in P, and an investigation was begun.

EQUINE ENCEPHALOMYELITIS was severe in the summer of 1933, 1,600 cases having been reported : one-third of them died.

ANAPLASMOSIS IN CATTLE was definitely diagnosed for the first time in Colorado.—J. E.

TUNIS. (1935). Fonctionnement des services de l'Institut Pasteur pendant l'année 1934. [**Report on the Work of the Institut Pasteur, Tunis, in 1934**]. [NICOLLE, C.]—*Arch. Inst. Pasteur Tunis.* **24.** 371-393. [1 ref.]

A large part of this report concerns rabies, statistics being given as advised by the International Conference upon Rabies (1927). It shows an increase in human infection (1,222 as against 1,208 in 1933) but only 1,009 cases were infected in Tunis, the remainder having come from other parts of the country. Ten deaths occurred in treated persons (eight before the 12th day of treatment) only two being considered unsuccessful. This brings the mortality to 84 (0·34 per cent.) of 24,143 treated up to the end of 1934.

It is said that this incidence is the result of the non-observance of antirabies laws in Tunis and Algeria. The animals implicated were :– dogs – 1,716 (8 deaths) ; cats – 126 ; solipeds – 23 ; ruminants – 22 ; jackals – 20 (2 deaths) ; rats and mice – 7 ; mongooses – 6 ; monkeys – 4 ; rabbits – 2 ; foxes – 2 ; human beings – 2. Official forms used do not ask for the age of fatal cases. With regard to human beings, the mortality has been found greater in children than in adults. Four fatal cases were not treated.

The remainder of the report gives a summary of medical and veterinary investigations and the preparation of biological products, and notes the scientific publications and work of the staff and a large number of workers attached to the Institute.—C. V. WATKINS.

SNIECKIENĖ, P. (1935). Valst. Veterinarijos Bakteriologijos Instituto diagnostikos ir apkrečiamuju ligu skyriu 1934 m. darbuotės apyskaita. [**Report of the Diagnostic Department of the State Veterinary Bacteriological Institute, Kaunas, Lithuania**].—*Vet. ir Zootech. Kovno.* **12.** 84-91. [Abst. from German summary].

During 1934, examinations were carried out on 3,036 specimens. Of these, 1,661 were on carcasses or organs, and 1,375 were on material being sold as food. A list is given of the diagnoses made on material from horses, cattle (462 cases of *Brucella abortus* infection), swine, sheep and poultry. Vaccines are prepared at the institute against *Salmonella pullorum* infection, and various streptococcal and paratyphoid infections.

BOOK REVIEWS.

CUSHNY, A. R. [M.A., M.D., LL.D., F.R.S., Late Professor Materia Medica and Pharmacology, University of Edinburgh], EDMUNDS, C. W. [A.B., M.D., Professor Materia Medica and Therapeutics, University of Michigan], & GUNN, J. A. [M.A., M.D., D.Sc., Professor Pharmacology, University of Oxford]. (1934). **A Textbook of Pharmacology and Therapeutics or the Action of Drugs in Health and Disease.** pp. x + 786. 75 figs. [Numerous refs.] London : J. & A. Churchill, Ltd. [10th Edit.] [8vo] [25s.]

The present edition is the second prepared by Edmunds and Gunn. The ninth edition brought the text into line with the last revision of the United States of America pharmacopoeia : the present edition, the tenth, brings the text into line with the British Pharmacopoeia of 1932. The opportunity thus afforded has been taken of bringing the text in other respects thoroughly up to date.

The general plan of the earlier editions has been maintained, each section commencing with a general discussion of the pharmacology of the agents dealt with, followed by a detailed description of the action of individual drugs. In

this edition the section on details of therapeutic uses immediately follows that on pharmacology, and a list of preparations and doses, with a bibliography, terminates each section.

The changes in the text have necessitated some increase in the number of pages, but the increase has been kept within reasonable limits " by curtailment of the space given to obsolescent drugs ", as Cushny wrote in the preface to the eighth edition. A short biographical note of the original author is inserted in place of reprinting the prefaces to the earlier editions.

Entirely new sections of the book are devoted to the use of liver and stomach preparations in the treatment of primary anaemias. The advance in knowledge of the chemistry and biological importance of the vitamins has rendered it necessary for that section of the book to be practically rewritten. It is perhaps significant that there is no mention of the Lovibond tintometer method of estimating vitamin A with antimony trichloride, although methods of biological estimation are discussed.

The section on iron has been rewritten and greatly increased in its scope, and the part played by copper in the treatment of human anaemias is discussed in the section on copper.

The increase in knowledge of hypnotics and basal anaesthetics is fully described. Certain points in regard to the barbiturates are of considerable importance to veterinarians. The stimulating effect of caffeine in barbiturate narcosis is emphasized.

In connexion with basal anaesthetics no mention is made of avertin, presumably on account of its known toxicity.

The book gives an accurate exposition of the knowledge of pharmacology as it stands to-day, and is equally of service to members of the veterinary and medical professions.—G. F. Boddie.

Branca, A., & Verne, J. (1934). Précis d'histologie. La cellule – les tissues – les organes. [**Text-book of Histology. The Cells, the Tissues, and the Organs**]. pp. 635. 420 figs. [160 refs.] Paris : Masson et Cie. [8vo] [Fr. 65].

This is a revised edition of the late Prof. Branca's book, brought up-to-date by Prof. Verne. The first part deals with protoplasm, with the structure of the cell and its physiology, reproduction, degeneration and death. The theories of cells and their structure are briefly reviewed, from the time of Hooke's discovery in 1665 to the present day. This section of the book has been rebuilt on more physiological lines, in accordance with modern conceptions.

In the second part the tissues are classified as (a) epithelial tissues, including lining membranes and glandular epithelium ; (b) connective tissues, in which group the body fluids are placed ; (c) muscular tissues, and (d) nervous tissues. The histology of each type of tissue is described.

The third part deals with the special histology of the organs, which are grouped according to their function. Thus, supporting and locomotory structures are considered together, and the lymph glands and the spleen are grouped with the body fluids. The thymus, salivary glands, liver and pancreas are included in the alimentary tract group. Other groups comprise the nervous system and sensorial organs, the respiratory system, the urinary system, and the reproductive systems. The endocrine glands are considered alone, and a final chapter deals with fertilization and embryology. The book is well produced on good paper, and plentifully illustrated with figures which bear a marked resemblance to what is actually seen under the microscope. It is of value to the post-graduate worker as well as the

student, and a list of the most important recent references appears at the end of each chapter.—NORMAN HOLE.

DU BOIS, A. (1934). Physiologie et physiopathologie du système réticulo-endothélial. **[Physiology and Pathology of the Reticulo-Endothelial System].** pp. 204. [30 pp. refs.] Paris : Masson et Cie. [8vo] [Fr.36].

Although much research work has been carried out on that part of the connective tissue of the body called by ASCHOFF " the reticulo-endothelial system ", our knowledge of its nature and functions is still very scanty, but to many physiologists and clinical pathologists it is a subject which would well repay study. The all-important advance in the study of this system was made when it came to be regarded as an organ in itself rather than a mere network for the tissues and organs to be built upon. Its physiological importance is intimately bound up with the whole process of interchange of material between the blood and the cells of the various organs of the body.

To both those who are interested in the subject and to those who desire some knowledge of the more recent research work and opinions regarding the reticulo-endothelial system, du Bois' book will be found extremely useful. It is divided into three sections. Section I deals with the morphology of the system, the process of fixation, the relation between the system and the blood and the cerebrospinal fluid, and the functional tests of the activity of the system. The second section demonstrates the importance of the system in the intermediate metabolism of the physiological pigments, lipoids, carbohydrates, water and albumin. The action of the system in infectious diseases with special reference to phagocytosis, immunity, allergy and anaphylaxis and also in intoxication is clearly shown. In the last section the part played by the system in therapeutics is discussed. The reader will find the large bibliography of great service if he desires to study the subject in greater detail.—JAMES STEWART.

SMITH, W. [M.A., M.D., B.Chir. (Cantab.)]. (1935). **Clinical Pathology and the Technique of Collecting Specimens.** pp. vi + 158. 27 text figs., 20 figs. on 9 plates, 4 tables. London : J. & A. Churchill Ltd. [8vo] [5s.]

Specimens sent to a laboratory for diagnosis are very frequently either spoilt or rendered useless, and a great deal of valuable time is lost through lack of care and attention in their preparation. In this book the author has compiled a great deal of useful information bearing on this subject and it has been written in a simple, non-technical manner chiefly for medical practitioners and students. The subject is also made more interesting to those not familiar with laboratory examination by descriptions of the elementary principles governing the tests.

A few of the author's statements are, however, open to question ; for example, on page 37, Pasteur is stated to have discovered the " antiserum " against rabies and, on page 27, the agglutination phenomenon is mixed up with the Wassermann reaction. On page 31, the author states that, by using sensitized vaccines, passive and active immunity can be introduced at the same time.

Although the book is written primarily for those interested in human pathology, the student of veterinary pathology will find a great deal of useful information which can be applied in his own particular sphere.—GWILYM O. DAVIES.